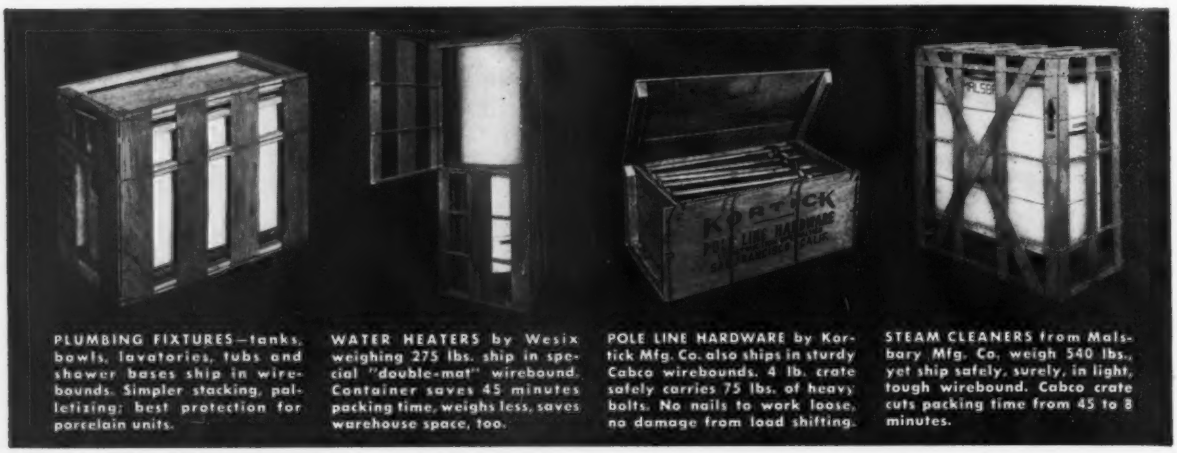
Western Industry

June 1954

Ready replacements, preventive maintenance, keep Western plants running smoothly. See pages 32, 89.

annual **PLANT & MAINTENANCE ISSUE**

Ever realize how many kinds of



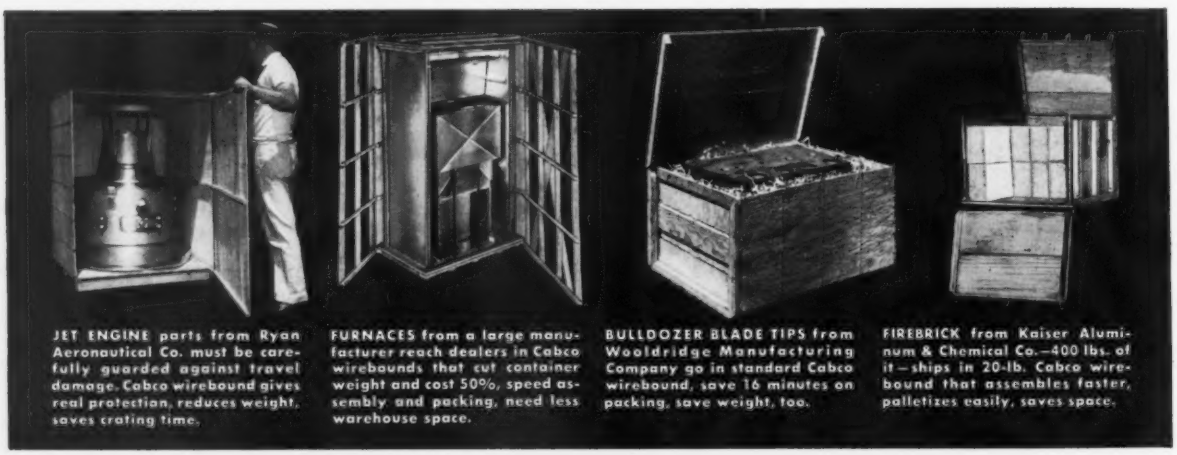
PLUMBING FIXTURES—tanks, bowls, lavatories, tubs and shower bases ship in wirebounds. Simpler stacking, palletizing; best protection for porcelain units.

WATER HEATERS by Wesix weighing 275 lbs. ship in special "double-mat" wirebound. Container saves 45 minutes packing time, weighs less, saves warehouse space, too.

POLE LINE HARDWARE by Kortick Mfg. Co. also ships in sturdy Cabco wirebounds. 4 lb. crate safely carries 75 lbs. of heavy bolts. No nails to work loose, no damage from load shifting.

STEAM CLEANERS from Malsbary Mfg. Co. weigh 540 lbs., yet ship safely, surely, in light, tough wirebound. Cabco crate cuts packing time from 45 to 8 minutes.

products ship more economically



JET ENGINE parts from Ryan Aeronautical Co. must be carefully guarded against travel damage. Cabco wirebound gives real protection, reduces weight, saves crating time.

FURNACES from a large manufacturer reach dealers in Cabco wirebounds that cut container weight and cost 50%, speed assembly and packing, need less warehouse space.

BULLDOZER BLADE TIPS from Wooldridge Manufacturing Company go in standard Cabco wirebound, save 16 minutes on packing, save weight, too.

FIREBRICK from Kaiser Aluminum & Chemical Co.—400 lbs. of it—ships in 20-lb. Cabco wirebound that assembles faster, palletizes easily, saves space.

in Cabco wirebound containers?

Add up the real cost of your present shipping container. How much to buy the container or its parts? How much to assemble; to pack? How much extra shipping cost for container weight that contributes nothing to strength?

Then, let a Cabco engineer show you the practical economics of Cabco wirebounds. These light, tough containers are engineered to your product. They fit perfectly, pack swiftly, save up to 50% on packing and shipping costs.

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for all applications involving high load, high speed, water hazard and wide temperature variations

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3. **Shell Alvania Grease has extremely high oxidation stability.**
4. **You'll find that Shell Alvania Grease extends time between greasings . . . a substantial saving in labor and grease.**
5. **Simple inventory . . . just the one grease to stock and apply.**

Why not let us show you how Shell Alvania Grease can save time and money in your plant. Write for technical information to Industrial Lubricants, Shell Oil Company, 50 West 50th Street, New York 20, N.Y.— or 100 Bush Street, San Francisco 6, California.

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The True Multi-Purpose Industrial Grease

SHELL®

Western Industry

JUNE 1954
Vol. XIX, No. 6

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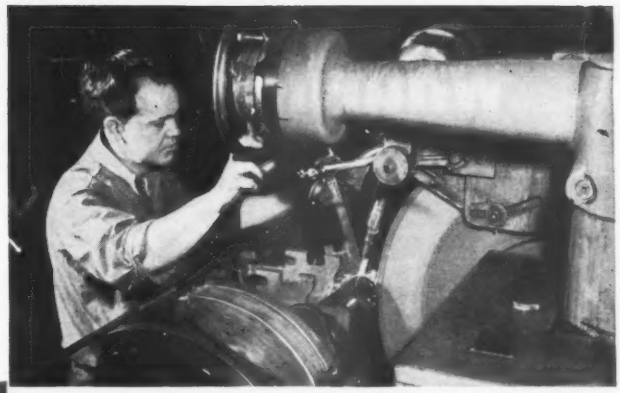
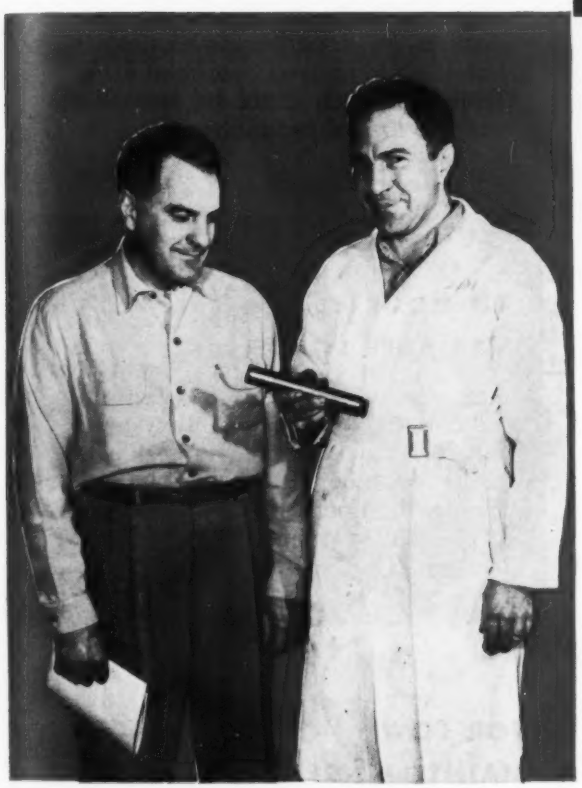


"Microsphere" spindle bearings on Landis crankshaft grinder are lubricated with Vacuoline Oil E.



Precision Engineering general manager John Vrilakas, left, inspects diesel part with production manager Mark Vrilakas before reconditioning process begins.

There's no margin for error in the business of reconditioning heavy diesel engine parts to minute tolerances—every job has to be right.

John Vrilakas, general manager of Precision Engineering Co. of Sacramento, says, "We depend on our lubricants as much as on our men and machinery—if a lubricant fails, we all fail. That's why we deal with General Petroleum . . . we know we're getting the best in lubricants *and* lube engineering."

In the ten years that G. P. lubricants have been used in Precision Engineering's hydraulically actuated grinders, boring machines, engine lathes and generator units, the firm has developed an enviable name in the trade. Today Precision's customers include contractors, loggers, mining companies and governmental agencies from every state in the West, as well as Hawaiian pineapple and sugar plantations.

Vrilakas attributes his expanding customer list to "Precision's minute attention to detail—and to the G. P. lubricants which help us to achieve it."

Line boring is a precision job calling for top grade lubricants.

Large or small, you'll find your plant will receive better all-around service from the G. P. lube engineer whose job is to keep your machinery running longer for less. Call your nearest General Petroleum office today for the tops in products and service.

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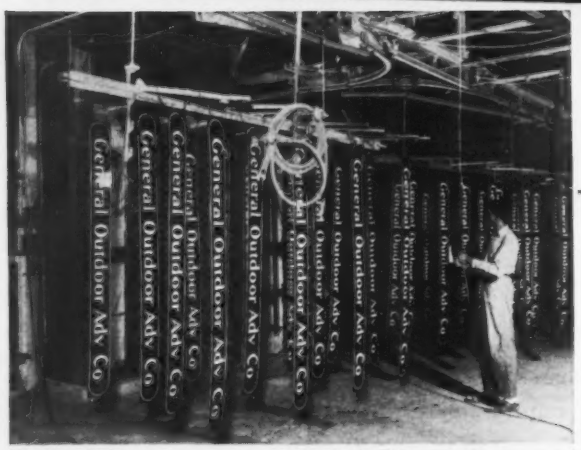

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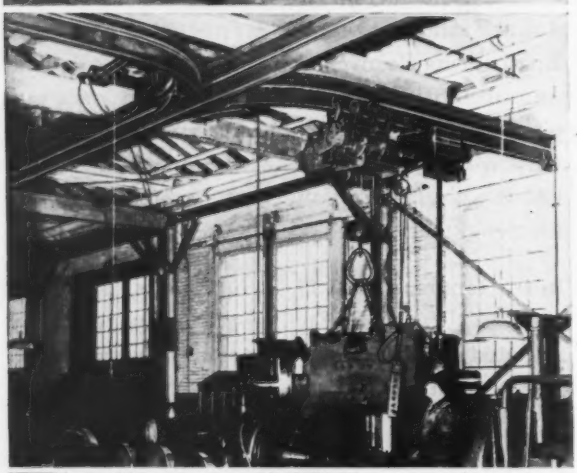
MonoRail relieves operating congestion by transferring materials handling to unused overhead area. Equipment can often be installed with no loss of production.



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American MonoRail equipment is specially engineered and carefully built for long-life, rugged service. Manual or automatic operation continues with little or no downtime for maintenance or repair.

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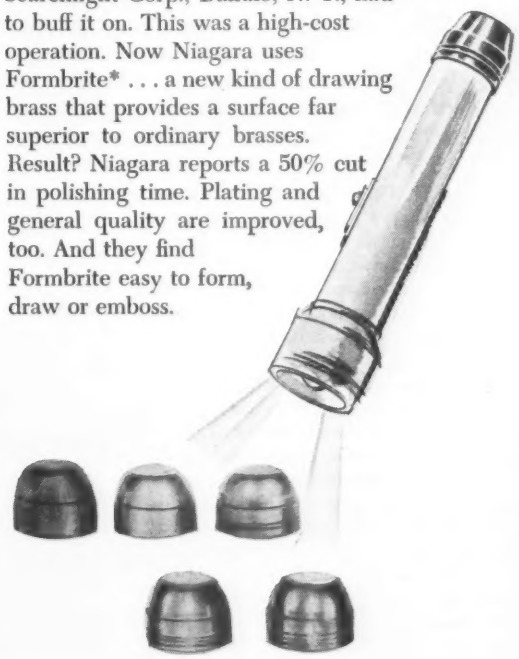
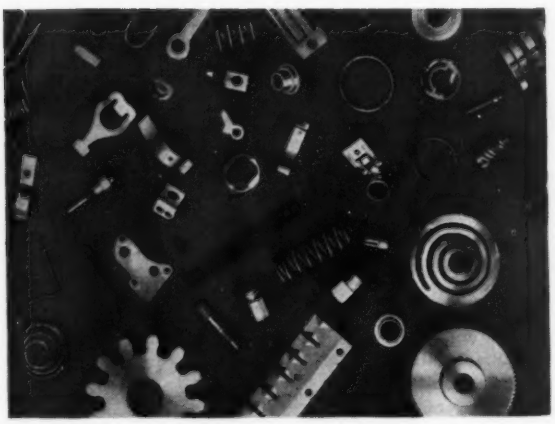
ANACONDA METALS AT WORK

The American Brass Company develops a new kind of brass that cuts polishing time 50% for one manufacturer and improves product appearance for another... makes bronzes that extend the life of many metal parts

Spotlight on high luster at low cost

The high luster on these brass flashlight end caps didn't come naturally. Niagara Searchlight Corp., Buffalo, N. Y., had to buff it on. This was a high-cost operation. Now Niagara uses Formbrite* . . . a new kind of drawing brass that provides a surface far superior to ordinary brasses. Result? Niagara reports a 50% cut in polishing time. Plating and general quality are improved, too. And they find Formbrite easy to form, draw or emboss.





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It's easy to take out. And you pay no premium. All you do is specify ANACONDA Phosphor Bronze for the many components like those shown. Ten alloys are available in seven forms. All are strong and tough. They bear up under constant wear and flexings, periodic stresses, fatigue and corrosion. They resist abrasion . . . conduct heat and electricity well . . . keep their high elasticity. We'll be glad to help you select the Phosphor Bronze Alloy that's just right for your job.

What's in a nameplate?

According to the Arlen Trophy Co., Brooklyn, N. Y., one of the largest trophy and premium manufacturers in the country, the *appearance* of a nameplate often means the difference between landing or losing a sale. But price is important, too. That's why Arlen now makes their nameplates out of Formbrite. It costs no more than ordinary brasses. Yet, because of its superfine grain structure, it polishes to a bright finish in half the time. Formbrite results in harder, stronger, springier, more scratch-resistant products, too.

Want more information?

Our Technical Department can give you a wealth of information on the properties and applications of Formbrite and Phosphor Bronze. Write to: *The American Brass Company, Waterbury 20, Conn. District Sales Offices: Los Angeles 17, Calif. at 816 West 5th St.—San Francisco 4, Calif. at 111 Sutter Building—Seattle 1, Washington at 953 Stuart Building.*

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GLADDING, McBEAN & CO. REFRACTORIES *Reporter*

NEWS-VIEWS OF INTERESTING WESTERN INDUSTRIAL DEVELOPMENTS

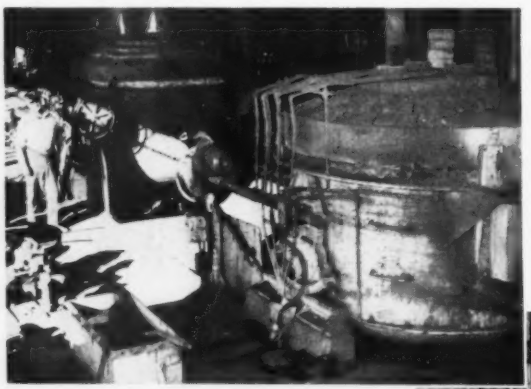
CONSTRUCTION MAINTENANCE TIPS

Gladding, McBean Super Pyramid Plastic Firebrick is a product that has many uses in modern furnace construction. Formulated for super duty service, it has a pyrometric cone equivalent of 34 and will withstand extreme operating temperatures and fluctuating furnace conditions.

Super Pyramid can be used for both new construction and furnace repairs. Packaged in a convenient malleable form, this heat-setting material requires no mortar or additional preparation. It can be installed against a backing wall or pounded into place where required for patching.

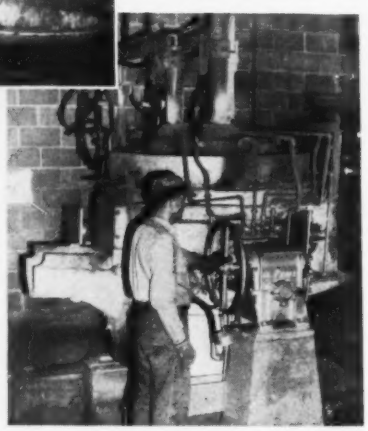
Since Super Pyramid Plastic Firebrick has a high P.C.E., does not shrink at high temperatures, has high spalling resistance and load bearing strength, it is ideally suited to many applications. It is frequently used to repair furnace walls and arches, to line small foundry ladles, and for forming furnace burner ports. If you would like complete technical information on this versatile product, contact your Gladding, McBean Refractory Sales Engineer.

Typical furnace wall of a large boiler demonstrates monolithic construction with Super Pyramid Plastic Firebrick. The deep scoring marks are contraction cuts.



Left: The new 5-ton electric furnace in foreground will be used for regular production.

Below: This small 1-ton electric furnace is designed for melting special alloy steels.



HANFORD FOUNDRY ADDS NEW ELECTRIC MELTING FURNACES

Hanford Foundry Company of San Bernardino, California, more than doubled its melting capacity recently with the addition of two electric melting units. One new furnace has a capacity of 5 tons. The second smaller unit is rated at 1 ton capacity and will be used for melting special alloy steels.

Gladding, McBean & Co. silica brick, special shapes, and specialties are used to form furnace roofs, walls and bottoms.

Hanford Foundry Company is one of the best equipped and most modern steel casting foundries on the West Coast. The new furnaces are part of a general program of plant expansion and improvement.

9½ Tons of Litecrete=One Guillotine Furnace Door

The workmen pictured at right are relining the guillotine door of Southern California's largest stress relieving furnace of its type, located in Alhambra at the Southwest Welding & Manufacturing Company plant. It took 9½ tons of Gladding, McBean Litecrete Refractory Insulating Castable and almost four hours of pouring to complete the job. Southwest Welding uses the large stress relieving furnace in connection with the fabrication of large steel tanks.

GMB FIRST IN THE FURNACES OF WESTERN INDUSTRY

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By the way, did you know that Shelby, Ohio was the birth place of the seamless steel tube industry in America?

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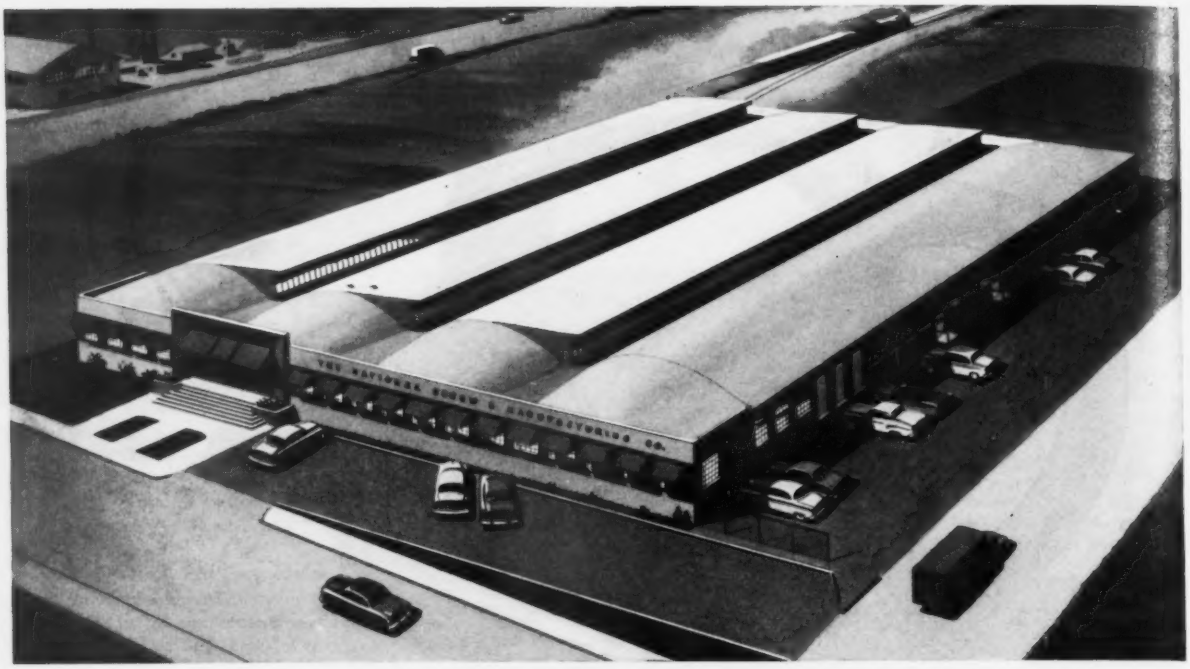

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You'll save time and money by bringing your fastener problems to us at our Los Angeles plant . . . less than 24 hours shipping time away from your West Coast plant. You can call "National" representatives in San Francisco, Seattle or Denver . . . or contact us direct for your fastener needs.

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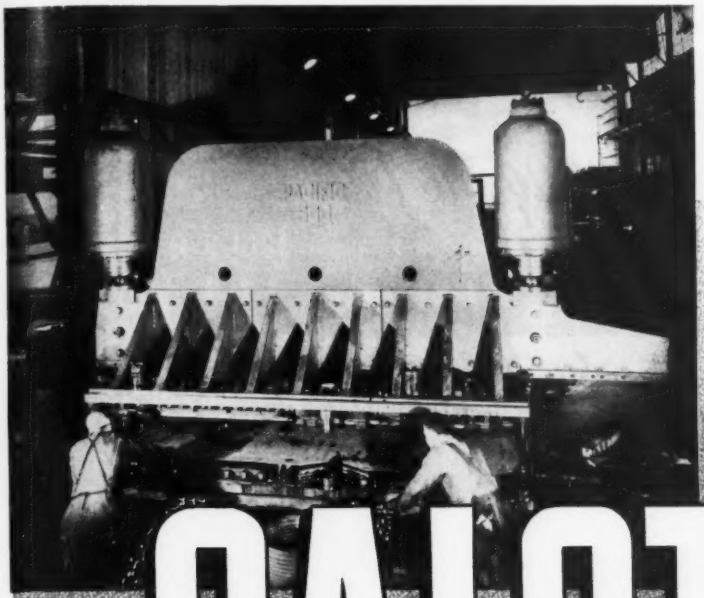

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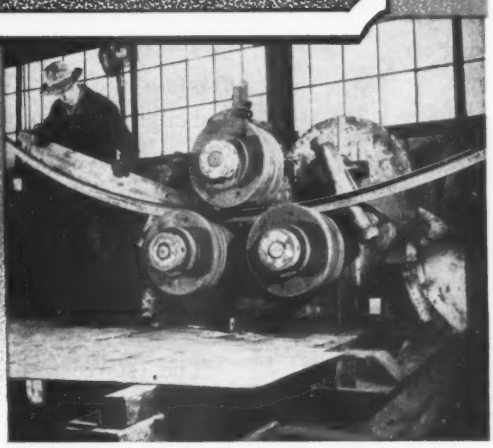

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This is your great opportunity to discuss your problems with technical experts. This is your chance to examine and compare new equipment; to discover new methods of maintenance and plant operation; to find new ways of reducing costs and boosting production.

The 1st Western Plant Maintenance Show is an idea show, a fact show with a content for you equalled only by the National Plant Maintenance and Engineering Show held annually in the East.

It will pay you real dividends to attend. There is no registration fee for the Western Plant Maintenance Show. Send the coupon today. for expedited registration cards!

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Air Conditioning, Heating, Ventilating Equipment

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(Flooring, Roofing, Siding, Doors, Fences, Furniture, Fire Protection and Insulation)

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(Cleaners, Floor Machines, Maintenance Materials)

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(Motors, Switches, Breakers, Fuses, Switchgear, Transformers, Capacitors, Substations, Lighting, Electrical Instruments, Wiring Supplies, Insulation, Batteries, Intercommunication)

Instruments — Meters — Gauges

(Electrical and Non-electrical)

Lubricants and Lubricating Equipment

Management Consultants and Services

Materials Handling Equipment

Paints, Painting Equipment and Product Finishes

Power Generation and Distribution Equipment

(Pumps, Compressors, Boilers, Stokers, Steam Engines, Turbines, Diesels, Generators, Valves, Pipe, Fittings, Filters, Separators, Traps, Packing, Gaskets, Retainers, Compounds, Seals, Flexible Hose and Tubing and Accessories)

Power Transmission Equipment

(Gears, Drives, Pinions, Speed Reducers, Variable Speed Transmissions, Chain Drives, V-Belts, Pulleys and Accessories, Bearings, Pillow Blocks, Sleeve Bearings, Bearing Metals)

Miscellaneous

(Safety equipment, Soaps, Skin Creams, Washroom equipment, Cafeterias and Recreation)

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(M-11)

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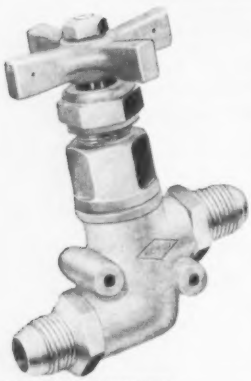


OFFSET GLOBE VALVE

High pressure Needle & Globe Valves by Republic have forged bodies for super duty service—brass, steel, aluminum alloy, or stainless steel. Pipe, AN, or JIC tube ends, or combinations. Sizes ⅛"-1". Operating range: Needle—3,000 psi; Globe—2,000 psi;—65° to 350°F.

CHECK

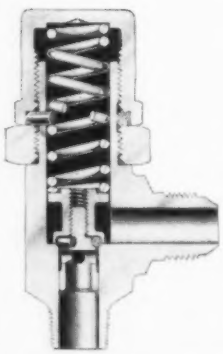
Republic Check Valves are sturdily built for either 500 psi or 3,000 psi hydraulic service—brass, aluminum alloy, steel, and stainless steel. Pipe, AN, or JIC tube ends, or combinations. Sizes ⅛" to 1".

PLUG

4-WAY PLUG VALVE, WITH DRAIN

Republic Plug Valves are manufactured in a wide variety of models—2-way, 3-way, 4-way body styles with different combinations of connecting ends—Pipe, AN, or JIC tube ends. Sizes ⅛"-1". Working pressures to 125 psi—Temperature range 0°-300°F.

RELIEF



Guided shut-off pistons distinguish the new Republic Relief Valve — External adjustment with "O" ring sealed cap. Quick unloading and smooth, quiet operation. Available in two styles: with all metal seat and with synthetic rubber seat. Pressure settings to 360 psi on standard valves—to 1,000 psi on special order.

SPECIAL

Call us for quotations on any special valves, hydraulic units, and special machines engineered to your specifications.

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Complete your tubing set-up with PARKER Tubing Fittings—Known throughout industry for their quality and dependability. Our stocks of brass, steel, aluminum alloy, and stainless steel Parker fittings are the largest in the West. Ask for Parker Catalog #4300.

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Please send me the new Republic Valve Catalog.

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37 YEARS' EXPERIENCE IN SUPPLYING MAINTENANCE NEEDS OF INDUSTRY FOR AIR, OIL, WATER, GAS & STEAM

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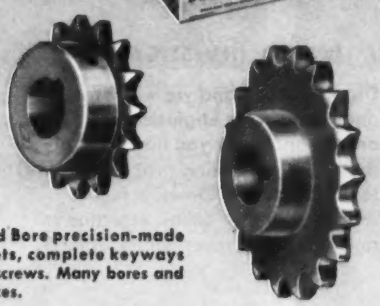
HIGH QUALITY, DEPENDABLE—

DIAMOND ROLLER CHAINS AND SPROCKETS

Packaged 10' lengths of Chain. Reels for 50' lengths and over.

Pitch	Roller Width	Chain No.
3/8"	3/16"	DIAMOND No. 82 AM. STD. No. 35
1/2"	1/4"	DIAMOND No. 41 AM. STD. No. 41
1/2"	5/16"	DIAMOND No. 66 AM. STD. No. 40
5/8"	3/8"	DIAMOND No. 449 AM. STD. No. 50
3/4"	1/2"	DIAMOND No. 433 AM. STD. No. 60
1"	5/8"	DIAMOND No. 434 AM. STD. No. 80



Finished Bore precision-made Sprockets, complete keyways and setscrews. Many bores and tooth sizes.

Taper-Lock Sprockets with replaceable bushings to meet wide range of bores.

The constantly increasing use of Diamond Roller Chain for power transfer has made possible the wider range of Finished-Bore Sprockets which with the Taper-Lock replaceable bushing type Sprockets for the large bores, provide stock drives to meet the vast majority of requirements.

RE-WORKING ELIMINATED

Since Diamond Finished-Bore Sprockets are complete with keyways and setscrews and are available from stock in 75 tooth sizes with more than 280 accurately finished bores—the job of re-working as required by conventional minimum bore sprockets is eliminated.

QUICKER SERVICE AND DELIVERY

This combination of packaged Diamond Roller Chains in American Standard sizes, wide range of solid sprockets and the Taper-Lock replaceable bushed sprockets, provide for quick delivery from distributors. New Catalog 753 gives all details.

DIAMOND CHAIN COMPANY, Inc.

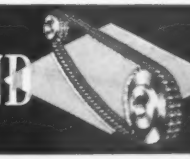
Where High Quality is Traditional

Dept. 606, 402 Kentucky Avenue, Indianapolis 7, Indiana

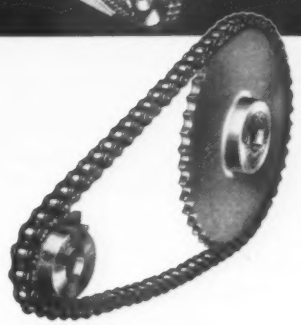
Offices and Distributors in All Principal Cities

See the yellow pages of your classified telephone directory for the address of the Diamond Chain distributor

DIAMOND ROLLER CHAINS



Write for latest literature



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ARWOOD'S PRECISION INVESTMENT CASTINGS

- Eliminate prohibitive machining costs, assembly of component parts, losses from waste metal, reduces percentage of rejects.
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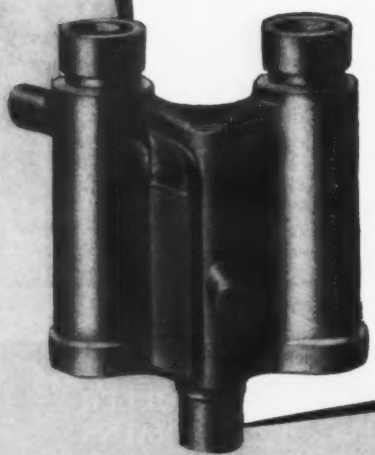

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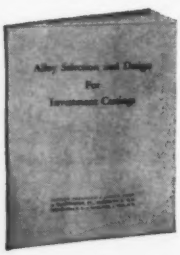

Drop us a line and we will have one of our sales engineers call on you and show you how to apply the precision casting process to your industry. Or write for our free booklet "Alloy Selection and Design for Investment Casting".

ARWOOD solved the problem of achieving quantity production of this intricate valve body.

The critical phase was to produce a pressure-tight valve body for use under very special and difficult conditions. The result is this 18-8 stainless steel leak-proof casting produced in quantity by ARWOOD. Tests of each casting by the Helium Mass Spectrometer confirmed leak-proof quality of total production.

Producers of ferrous and non-ferrous precision castings for over a decade.

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Cut wire fence re-coating costs!

Users Report Savings of 30% to 40% With Rust-Oleum Extra-Long Nap Lamb's Wool Roller!

Special roller glides easily over wire sections. 99% of the material is used on the fence—*not* on the workers, *not* on the ground.

A *new, exclusive, different-type* roller! Greater diameter, specially-selected skins, and Extra-Long Nap Lamb's Wool give more coverage . . . *faster!*

Extra-Long Nap Wool plus Rust-Oleum's *exclusive* penetrating qualities work in to coat approximately 70% of other side of fence at same time.

Man follows with "dry" roller on opposite side of fence to catch and use surplus and quickly coat remaining 30% of the wire sections.

Even barbed wire sections can be roller-coated in one easy pass with special Rust-Oleum Roller.

On longer fences, brush men, as part of fast moving "team", follow roller men to brush pipe framework and arms.

STOP with RUST!

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ATTACH TO YOUR LETTERHEAD—MAIL TODAY!

RUST-OLEUM CORPORATION
2627 Oakton Street, Evanston, Illinois

Please show us how your new Extra-Long Nap Lamb's Wool Roller will cut our wire fence re-coating costs. Include prices, complete Rust-Oleum literature and nearest source of supply. We have approximately_____yards of wire fencing.

Contact Your Nearest Rust-Oleum Distributor Today

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Republic Supply Co.
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Los Angeles:
Phone: Underhill 0-2511

Republic Supply Co.
1919 Williams Street
San Leandro:
Phone: Lockhaven 2-0414

Sacramento Rubber Co.
721-723 "J" Street
Sacramento:
Phone: Gilbert 2-3847

Valley Foundry & Machine Works
2718 East Avenue
Fresno:
Phone: 3-6135

OREGON

Standard Supply Co.
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This New Anaconda Catalog Puts

The right cable accessory.

POTHEADS. A complete line engineered by power-cable experts for use with *any* make cable. Parts are *fully* interchangeable for greater adaptability, faster delivery, easier installation and lower costs. Anaconda supplies both gasket and soldersealed types.

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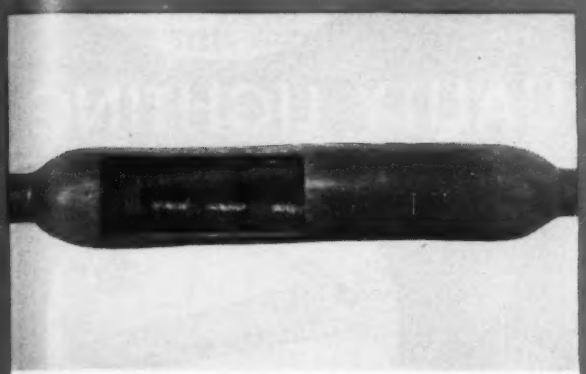

F-3* ALLOY-LEAD JOINT SLEEVE. F-3 has higher tensile strength, lower creep rate, greater bursting strength, and higher resistance to bending fatigue and vibration. Furnished with jointing kit when specified.

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JOINTING KIT. Your cable-installation crews have everything needed new and clean for a specific joint. Materials are always on the spot. Never forgotten. Never left behind. Kits assure neat, lasting job.

FILLING COMPOUNDS. A group of compounds both plastic and fluid to meet every need: for paper-, varnished-cambric and rubber insulated cable joints and potheads for voltages up to and including 69kv.

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QUICK SERVICE FOR GROWING WEST — *Anaconda's integrated plant at Orange, California, assures western industry of quick, sure service on wire and cable for every kind of application. Contact Anaconda Sales Office at: Los Angeles, San Francisco, or Seattle.*

See better with → QUALITY LIGHTING

Vision is a source of knowledge. To increase learning ability, increase vision. SMOOT-HOLMAN "QUALITY" lighting fixtures are engineered for the classroom. Sturdy concentric rings of the CIRCL-LITE offer the greatest efficiency of low-brightness indirect illumination. A comfortable, better controlled light for the rigid requirements of classroom seeing. Dust free, contemporary designs are a major advancement of classroom beauty. Approved by the State of California Division of Architects as EARTHQUAKE PROOF. You can apply other SMOOT-HOLMAN "QUALITY" lighting fixtures to your lighting needs. Specify and Install "QUALITY"—THERE IS A DIFFERENCE—

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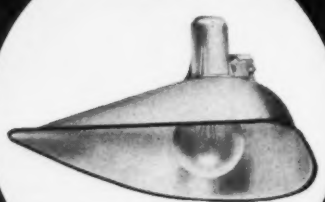

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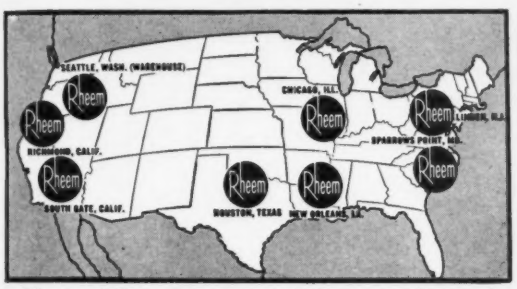
GET BOTH STEEL AND FIBER DRUMS QUICKLY-FROM ONE SOURCE-RHEEM

RHEEM STEEL CONTAINERS ARE MADE IN 7 STRATEGIC LOCATIONS



Rheem Fiber Drums are being manufactured in three of these plants. Production lines are scheduled for installation in other plants soon.

"FAMILY" IDENTIFICATION

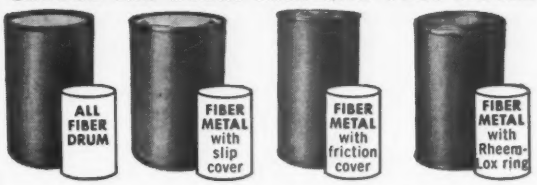
Rheem can furnish on Fiber drums the same type of decorative service it provides users of Rheemcote lithographed steel drums. Any design or trade mark can be reproduced on an all-over label for Fiber drums in any number of colors to provide "family" identification for your products.

30 gal. Rheem Fiber-Metal Drum 55 gal. Rheemcote Steel Drum

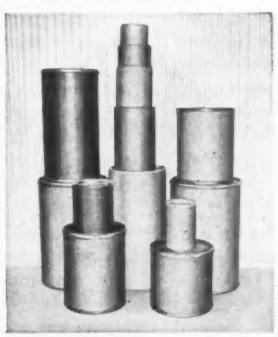
RHEEM ANNOUNCES A COMPLETE LINE OF FIBER DRUMS TO SUPPLEMENT ITS STEEL SHIPPING AND EQUIPMENT CONTAINER LINES

To supplement its line of steel shipping and custom equipment containers, Rheem has added a complete line of Fiber and Fiber-Metal drums. These strong, light weight, inexpensive drums come in four types and in a wide variety of sizes.

Choose the Drum that Fits Your Needs



Choose the type that best fits your needs – All-Fiber drums, or Fiber-Metal drums with either slip or friction covers or with the new, easy to install and remove Rheem-Lox ring. Only Rheem offers all these types of low cost containers.



Choose the Size that Fits Your Needs

Choose the size that best fits your needs. Fiber drums from 1 to 32-gallons in capacity; Fiber-Metal drums from 5 to 60-gallons. There is virtually a size for every possible requirement.

RHEEM
MANUFACTURING COMPANY

Chicago 29, Illinois • New Orleans 20, Louisiana • Seattle, Washington
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NOW, MORE THAN EVER BEFORE, YOU CAN RELY ON RHEEM FOR ALL YOUR SHIPPING CONTAINER REQUIREMENTS

MAIL COUPON IN NOW!
for complete information

RHEEM MANUFACTURING COMPANY
(Mail to Nearest Sales Office, Listed at Left)

☐ We would like to have your packaging engineers come to our plant and study our shipping container problems.

☐ Please send additional information.

NAME OF COMPANY_____

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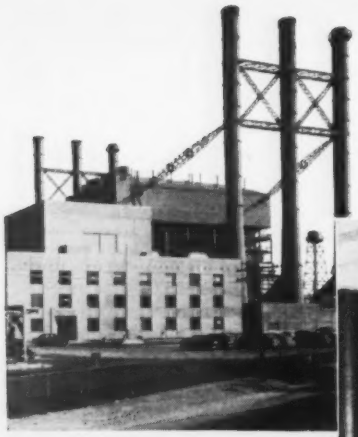
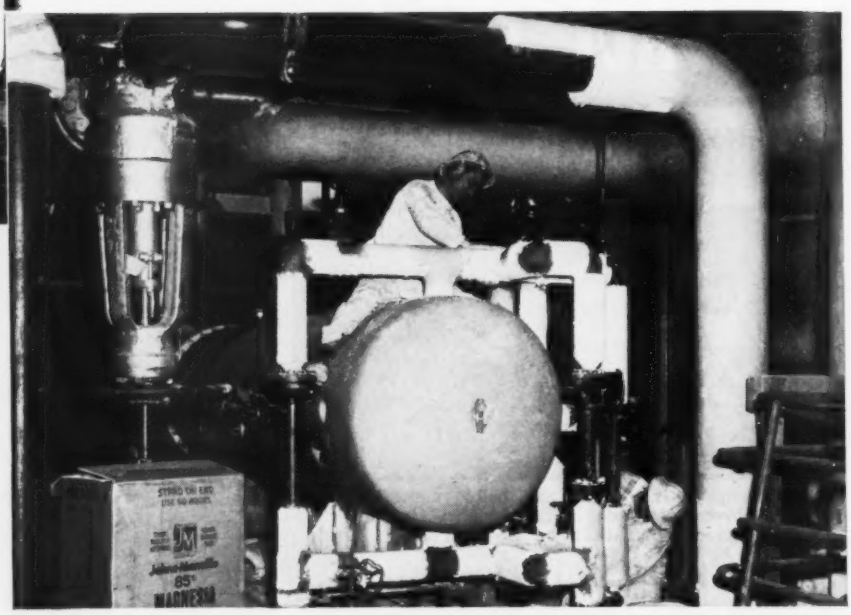
CITY_____ ZONE____ STATE_____

BY_____



At the new Moss Landing generating plant



(Top) Moss Landing, California steam plant of the Pacific Gas and Electric Company, designed by Stone and Webster Engineering Corporation, under the supervision of the P. G. and E. Engineering Dept.

(Right) Skilled applicators of an outstanding J-M Insulation Contractor, Western Asbestos Company of San Francisco, applying J-M 85% Magnesia to pipelines during construction of the Moss Landing plant.

P. G. and E. INSULATES WITH SUPEREX-85% MAGNESIA TO LOWER POWER PRODUCTION COSTS

When Pacific Gas and Electric Company invested $80,000,000 in its new 771,000-horsepower electric generating giant at Moss Landing, California...the insulation, like all other materials, had to meet rigid specifications. *For this important project, Johns-Manville Superex-85% Magnesia double-layer insulation was used on superheated steam pipes.*

Superex Combination Insulation consists of Superex*, a J-M insulation for temperatures to 1900F, and J-M 85% Magnesia. It was installed at the Moss Landing plant for maximum thermal efficiency and long trouble-free service. This double-layer construction, proved in over a quarter-century of outstanding on-the-job performance, utilizes the higher heat resistance of Superex next to the hot surface—the greater insulation value of J-M 85% Magnesia for the outer layer. It eliminates through joints, protects the jacket against scorching and is unharmed by expansion encountered in pipes carrying superheated steam.

J-M 85% Magnesia is the leading insulation for temperatures to 600F. It will not distort regardless of its length of service. It fits snug, stays tight. Heat savings, therefore, remain constant for the life of the equipment on which it is applied.

Whatever the insulation—it must be properly engineered and installed to pay maximum dividends. That's why Johns-Manville offers industry the services of experienced J-M Insulation Engineers and J-M Insulation Contractors. These men stand ready to combine their talents and give you an insulation job that will more than pay off your initial investment with maximum fuel savings.

For further information, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

Double-Layer Superex-85% Magnesia Insulation was used on superheated piping at the P. G. and E. Moss Landing plant.

*Reg. U. S. Pat. Off.

Johns-Manville *FIRST IN* INSULATION

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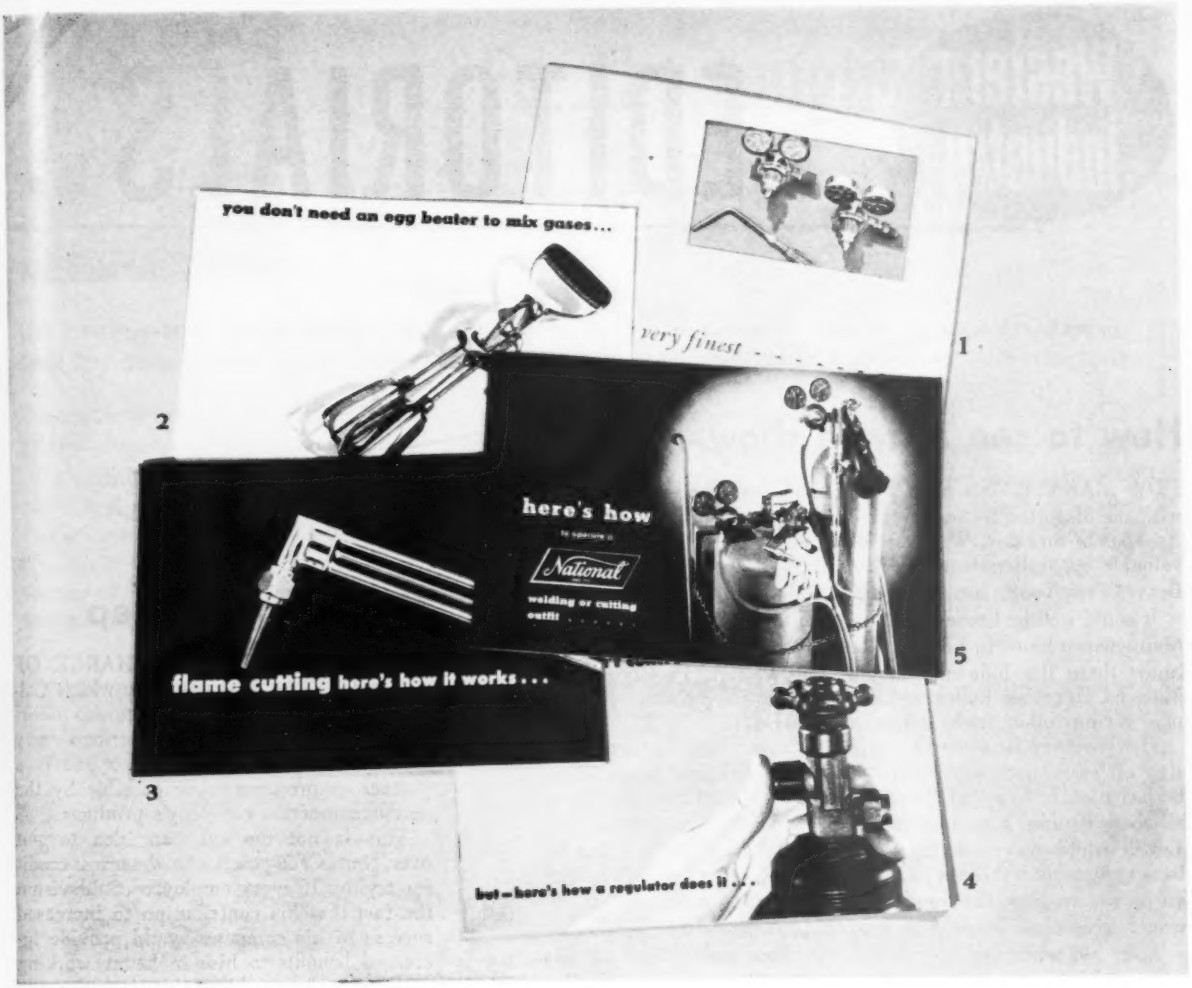
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Western Industry

EDITORIALS

How to see a trade show

HOW MANY TIMES have you come home from a trade show with the disgusted feeling "Why did I miss So-and-So's exhibit?" Apropos of that fact, WESTERN INDUSTRY is in receipt of a highly valuable suggestion from E. R. Barkley, sales vice-president of Beaver Pipe Tools, Inc., of Warren, Ohio.

It could well be heeded by those who take in the Western Plant Maintenance Show in Los Angeles in July, the Western Electronic Show there the following month, the Western Packaging and Material Handling Exposition in San Francisco, also in August, plus various other trade shows in the West.

The tendency is, according to Mr. Barkley (and we agree), to stop off at a booth where the visitor finds someone from whom he has been buying and spend most of his time there. He knows all about his host's product, but there is a good chance for a visit, and he comes away missing a lot he could have learned had he been systematic in his approach to the problem. If he had checked off on his program the things he wanted to see and look into, he would have come home with something to show for his time.

After all, when one spends his own time and money (or his company's) to attend such a show, it should not be considered a vacation, nor the occasion for late arrival followed by two and three hour luncheons, with nothing accomplished. On the other hand, it is a chance to learn and thus improve one's own job or the operations of the company for which one works (or owns).

It doesn't have to be poor

COAL IS THE POOR RELATION in the Western fuel and energy family right now. Natural gas is the fair-haired boy, oil the steady and dependable youngster who gets along without parental help, hydroelectric power the problem child that is taking a course in "progressive education" supposed to bring it up to normal I-Q, water its twin brother going through a similar school, and atomic energy the unborn child expected to outshine the rest of the family.

But coal! Poor coal! Family tradition says it is just something you burn in a stove or furnace and can't be taught anything else, so if it isn't as smart as the others it's just too bad.

For our money, however, we need 'em all here in the West, for as the West grows it will have to draw on all its resources in undreamed-of fashion. Why can't all the universities in those Western states blessed with a lot of coal get together in some sort of joint project to explore all the possibilities for coal? Some of them are already doing it individually, but a joint or co-operative project would be more efficient.

New kind of Veep

"VICE-PRESIDENT IN CHARGE OF THE FUTURE" is the title by which Colorado Fuel and Iron Corporation's newspaper "The Blast" recently described every employee. In other words, each one is a partner in progress made possible by the acceptance of the company's products.

This is not too easy an idea to put over, but CF&I certainly deserves credit for trying. If every employee could vision the fact that his contribution to increased success of his company would provide increased benefits to him in better working conditions, justifiable pride in the company's accomplishments, and more financial remuneration (if the company's position and the thinking of its management sanctioned it), he would find lasting satisfaction in such a title.

But to get him to see it involves two things: first, consistent effort to sell the idea, rather than a "one-time shot"; second—and still more important—management must do its part in living up to the promise. The whole proposition had better be skipped if it is confined to stuffy pontification and pious platitudes based on the premise that the debt of gratitude is something which the employee alone owes, and that the employer does not bear corresponding and equal responsibility.

But if every company and its management would sincerely strive to make the confidence of its "vice-presidents in charge of the future" in its acts and policies justified, how much more cooperation and increased production it would get.

"For the toughest lubricating jobs...UNOBA!"

Jack Dressen, superintendent of maintenance, Soulé Steel Company, San Francisco, California

"Here at Soulé Steel Company we rely on Union's UNOBA grease to do the *toughest* lubricating jobs around our plant.

"This machine which we developed, for example, bends heavy steel reinforcing rods in the twinkling of an eye. You can readily imagine the shock and loads imposed on bearings in the power train between the five H.P. motor and the table which turns at 16 R.P.M., exerting the 750 foot-pounds necessary to bend 1½"-diameter steel.

"Yet in six years of constant service this machine has never required a bearing replacement...much of the credit must go to Union's UNOBA which we've always used to lubricate these vital bearings."

For an industrial grease that can *really take it* specify *New Improved* UNOBA...compounded from high V.I., 100% paraffin oils, a highly effective oxidation inhibitor and *barium-lithium* soap bases. *New Improved* UNOBA — proved by field testing — is the finest multi-purpose grease offered at any price. Available *now* from your Union Oil representative.

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Put a layer of
STEEL
under *every job* in your plant!

Production zooms ahead... overhead drops
...when Trojan Corrugated Boxes and Skids take over!

Fast, safe, material handling cuts *down time*, speeds work flow. Trojan steel Corrugated Boxes and Skids reduce waste, damage and losses. You'll get double life from your plant equipment if you let *steel* do the job. But be sure you specify rugged Trojan steel Skids and Corrugated Boxes. Here's why:

Trojan Skids are formed from 10-gauge steel, available with or without steel floor runners. Corrugated 12-gauge steel Boxes have a double-thick, rolled flange around the top for extra strength. Lugs are welded to the outer rim for easier tiering or lifting. Boxes are available welded direct to steel Skids, or removable, as desired.

Trojan custom makes all types of industrial material handling Skids and Corrugated Boxes to meet individual requirements. There's a Trojan answer to your material handling problem. Start cutting your overhead now—call Trojan!

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Write today for your copy!

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AUTO SHEET METAL WORKS
737 EAST GAGE AVENUE, LOS ANGELES 1, CALIFORNIA

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Plant rearrangement helps

Editor, WESTERN INDUSTRY:

We would like to obtain a copy of the February 1954 issue of WESTERN INDUSTRY in which there is an article "800 Travel Feet Saved." Will you please forward a copy to me personally, with bill, and I will reimburse you for same.

H. R. LARSON
Northeast Region Manager
Manufacturing & Repair Div.
Westinghouse Electric Corp.
Hillside, N. J.

Fleet operations analysis

Editor, WESTERN INDUSTRY:

It is understood that some time within the past year an article appeared in WESTERN INDUSTRY which was in regard to the trucking industry. I am not sure of the author's name, but I believe that he is an associate of Booz, Allen & Hamilton.

Will you please advise us as to the date, price, and availability of this?

LAURA WHITE
A. T. Kearney & Co.
Chicago

Boiler maintenance

Editor, WESTERN INDUSTRY:

Mr. Frank M. Gabbert of San Francisco, Calif., has sent to us an interesting article from your publication. This article is entitled "Better check boiler corrosion before you have a steam explosion," by William R. Carter.

May we extend our appreciation for your editorial emphasis on the importance of safety in the field of air, steam and water applications.

If at any time we can be of assistance to you in preparing other material along this same line or in connection with engineering or field servicing problems, we wish you would call upon us.

NORMAN D. VAUGHAN
Assistant to the President
Watts Regulator Company
Lawrence, Mass.

NEW or USED...
your Hyster Dealer is the best place to buy lift trucks

Another HYSTER first..

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ONLY HYSTER DEALERS OFFER 'HY-QUALITY" WARRANTED LIFT TRUCKS

"Hy-Quality" Reconditioned Industrial Trucks are backed up by a *written warranty*. "Hy-Quality" Trucks are thoroughly inspected and completely reconditioned in accordance with *factory-specified standards*.

"Hy-Quality" Used Lift Trucks are an economic answer to low-budget purchases, part-time or seasonal operations. Consult us on the benefits of a used lift truck for your job. Remember, a used lift truck is only as good as the dealer organization backing it up.

Buy "Hy-Quality" Used Lift Trucks to cut materials handling costs! We will be glad to go over your operation and recommend the *right* truck.

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- Lift Trucks 1,000 to 18,000 lbs.
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Parts that can take it...

because they're UNIONMELT Welded

Dipper sticks have to be strong to absorb severe stresses. That's one reason why the three main sections of this part are UNIONMELT *welded. Sound welds can be made in metal up to 3-in. thick in a single pass.*

A power shovel dipper stick has to be strong. It must withstand severe banging, twisting, and bending stresses as its huge scoop bites out hundreds of tons of earth and rock in each day's operation. But these dipper sticks can take it—they're made by UNIONMELT welding.

Strong, clean UNIONMELT welds can be made in metals up to 3-in. thick in a single pass. There is no limit to the metal thickness that can be joined by multiple passes.

Research and years of experience have helped LINDE to develop a top notch team of fabricating processes—HELIARC, sigma, and UNIONMELT welding. For small shops or huge production lines, from carbon steel to complex alloys—there is a LINDE electric welding process to do the job. Your local LINDE representative will help you determine the best welding process for your job. Call him today for more information.

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P&H OVERHEAD CRANES

These P&H Magnetorque Cranes are located in the Chrysler Corporation Nine Mile Press Plant in Detroit. A total of 24 P&H Cranes with Magnetorque control now serve various divisions of Chrysler Corporation.

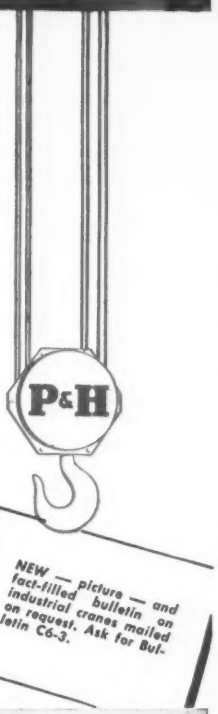
"More of the Same" for Chrysler ...with P&H MAGNETORQUE® the job-approved AC Crane Control!

In six short years . . . over nine hundred installations in America's best-known plants! That's the remarkable success story of Magnetorque — the P&H development that revolutionized the crane industry.

You'll get superior performance . . . the finest known speed-load characteristics . . . with this time-proved and job-proved AC crane control. P&H Magnetorque has no mechanical load brake, nothing to wear, nothing to replace. Think what that means in freedom from maintenance worries and costs.

P&H electrical equipment — *all of it* —is designed and built by Harnischfeger exclusively for crane service, *not adapted for it!*

Consult with P&H about your crane plans for any plant expansion or modernization program.



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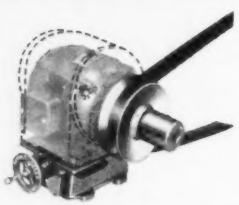
Vari-Speed Motor Pulley

Smaller Units!
More HP!

Completely new redesigned line from ½ to 15 HP!

NEW

"spiral-groove" lubrication



For new or old NEMA Motors

CHECK ALL THESE NEW REEVES FEATURES

1. New, smaller disc assemblies are engineered for new NEMA Motors, yet usable with old.
2. New spiral-groove lubrication assures complete lubrication for years of rust-free, trouble-free service.
3. One-point lubrication. Unit can be lubricated when stopped, or *while in operation.*
4. Superior base construction provides greater rigidity and strength, reduces vibration and noise.

REEVES PULLEY COMPANY ASSEMBLY PLANT
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Send Today for Complete Information!
Specify Bulletin V545.

CALENDAR OF MEETINGS

JUNE 13-JULY 23—*Advanced Management Seminar*, course in executive development, University of Washington, Seattle. Contact E. G. Brown, seminar director, U. of W.

JUNE 21-25—*Western X-Ray Diffraction School*, Berkeley campus of the University of California. Contact E. W. Milburn, General Electric Co., X-Ray Dept., 1269 Howard St., San Francisco.

JUNE 24-27—*National Truck, Trailer, and Equipment Show*, Pan Pacific Auditorium, Los Angeles. Contact J. M. Collins, Carnation Co., Los Angeles.

JUNE 25-26—*Pacific Coast Regional Conference on Clays and Clay Technology*, Berkeley campus of University of California. Contact Joseph A. Pask, Division of Mineral Technology, Berkeley, Calif.

JUNE 27-30—*Rocky Mountain Coal Mining Inst.*, Glenwood Springs, Colo. Contact F. Whiteside, 356 Lafayette, Denver.

JUNE 27-30—*Institute of Food Technologists*, Hotel Biltmore, Los Angeles. Contact A. N. Prater, Gentry Div., Consolidated Grocers Corp., Box 2076, Terminal Annex, Los Angeles.

JULY 13-15—*Western Plant Maintenance Show and Conference*, Los Angeles. Show at Pan-Pacific Auditorium. Conference at Ambassador Hotel. Contact W. J. Wilkin, Clapp & Poliak, Inc., 759 Monadnock Bldg., San Francisco 5.

AUGUST 17-19—*Western Packing & Materials Handling Exposition*, Civic Auditorium, San Francisco. Contact W. J. Wilkin, Clapp and Poliak, Inc., 759 Monadnock Bldg., San Francisco 5.

AUG. 25-27—*Western Electric Show and Convention*, Los Angeles. Show at Pan-Pacific Auditorium. Convention headquarters, Ambassador Hotel. Contact M. Mobley, Jr., 344 N. La Brea Ave., Los Angeles 36.

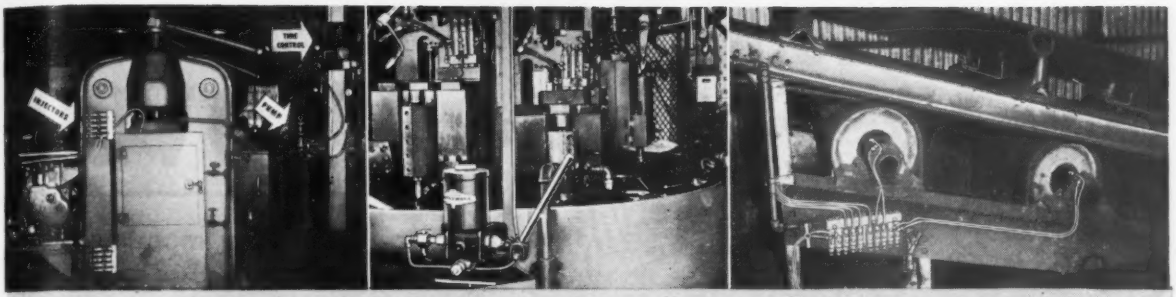
OCT. 8—*Washington Assn. of Operating Millers*, state meeting, Davenport Hotel, Spokane, Wash. Contact W. W. Liley, 1211 E. Sprague Ave., Spokane.

OCT. 25-27—*National Lubricating Grease Inst.*, San Francisco. Contact H. F. Bennetts, executive secretary, 4638 J. C. Nichols Parkway, Kansas City 12, Mo.

DEC. 3-4—*Northwest Mining Assn.*, Davenport Hotel, Spokane, Wash. Contact Association, MA 4822, Spokane.

1955

JANUARY 27-28—*Fruit and Vegetable Sample Cutting for Canners League of California*, Fairmont Hotel, San Francisco. Contact M. A. Clevenger, 215 Market St., San Francisco.

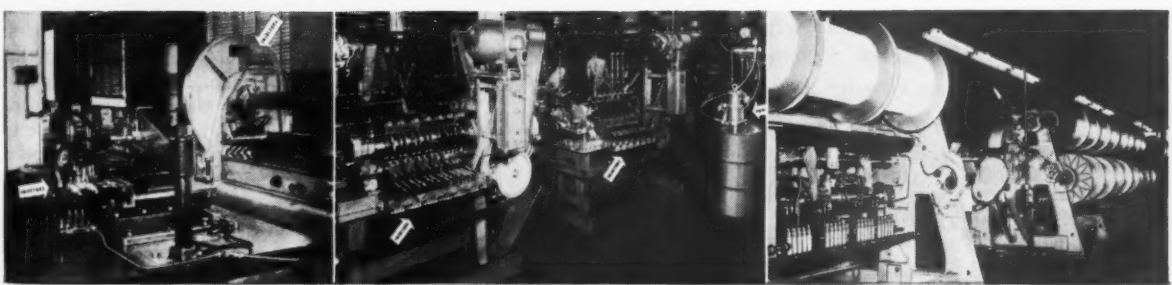


1 REDUCES REPAIRS
Lincoln Centralized Lubrication INCREASES BEARING LIFE 1500% ... power consumption reduced 30%. The Miller Company.

2 PRODUCTION INCREASED
Production increased 20%... equal to twelve new machines costing $816,000. And, $100,000 saved in maintenance, bearings, etc. Spicer Manufacturing Company.

3 CONSERVES MANPOWER
Lincoln System saves $32,240.00 a year in labor alone in coal preparation plant. Hanna Coal Company.

6 REASONS WHY
industry is installing *Lincoln* CENTRALIZED LUBRICATION SYSTEMS



4 REDUCES LUBRICANT CONSUMPTION
Lubricant consumption has been reduced by 50% and production increased. Cudahy Brothers.

5 REDUCES REJECTS
Rejects slashed 80%... production increased... operator efficiency increased. Motor Car Manufacturer, Flint, Michigan.

6 REDUCES POWER CONSUMPTION
Power cost reduced 20%, production increased 22%. Konit Mills.

TO REDUCE OPERATING COSTS...FAST! ...A PROVEN IDEA WORTH THOUSANDS OF DOLLARS TO *EVERY PLANT*

You can do what these corporations and hundreds like them have done to slash operating costs by applying the right lubricant, in the right quantity, at the right time—automatically, with a Lincoln system.

Lincoln
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Write for your **FREE** copy of Lincoln's new Catalog 80, showing the most complete range of Centralized Lubricant Application Systems on the market. Lincoln Lubrication Engineers will gladly work with you to determine the best lubrication system for your needs.

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☐ Have an engineer call.

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LOCATE YOUR PLANT
near America's Most Modern Port
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Labor-Saving Facilities to Speed Shipping

The Port of Long Beach is one of the many great advantages offered to shippers and industries in the Long Beach area. Here labor-saving installations speed cargo movement.

Typical of the many fine facilities is the bulk loading conveyor which will load and trim bulk cargoes at a rate of better than 500 tons per hour. Used in conjunction with an electric vibrator car shake-out, the loader makes quick work of cargoes such as iron ore, coke, coal, potash, sulphur, salt, gravel and cement.

The hopper bins accommodate two carloads at a time; the wharf handles 80 cars, and approaches provide for 150 additional cars—all making for smooth, continuous operation.

Plenty of Skilled Labor to Serve Industry

To operate such Harbor facilities and to serve all industry there is a large reservoir of skilled and technical workers who own homes here.

Thousands of them came here during the war for defense jobs. They liked Long Beach so well they stayed to work in other growing industries. Many others are moving here daily.

Probably no other area offers such a concentration of desirable labor. And they'll be glad to work for you in Long Beach because, although they live here, many of them now work far from home.

Write for free industrial brochure describing the 12 other reasons for locating your plant in the Long Beach area. This invitation is extended by the City of Long Beach and its Board of Harbor Commissioners. Ask for complete details—in confidence, if you like.

CHAMBER OF COMMERCE • DEPARTMENT OF INDUSTRY

200 East Ocean Boulevard, Long Beach 2, California

THIS MONTH'S COVER

Preventive maintenance coming into its own

NOTHING BUT AN UGLY DUCKLING and a necessary evil a few years ago, the lot of preventive maintenance has been steadily rising to fill the position of a key factor in maintaining production. Progressive industry that is planted in the West to stay has learned, sometimes through bitter experience, that sustained production and low costs of operation cannot be left to luck.

Management is daily discovering that a carefully thought-out preventive maintenance program will make for smoother operation, controlled down-time, and greatly reduced cost of repairs. And the apparent trend towards, and growing acceptance of, preventive maintenance by Western management would seem to be further indication that industry in the West is passing another milestone on the road to permanence and maturity.

The Fresno plant of North American Aviation, Inc., gives evidence of the thought and planning that present-day management believes is warranted in setting up a standard of maintenance procedures to cover everything from replacing a burned-out electric light bulb to erecting a 10,000-sq. ft. warehouse. (See page 78 for the details.)

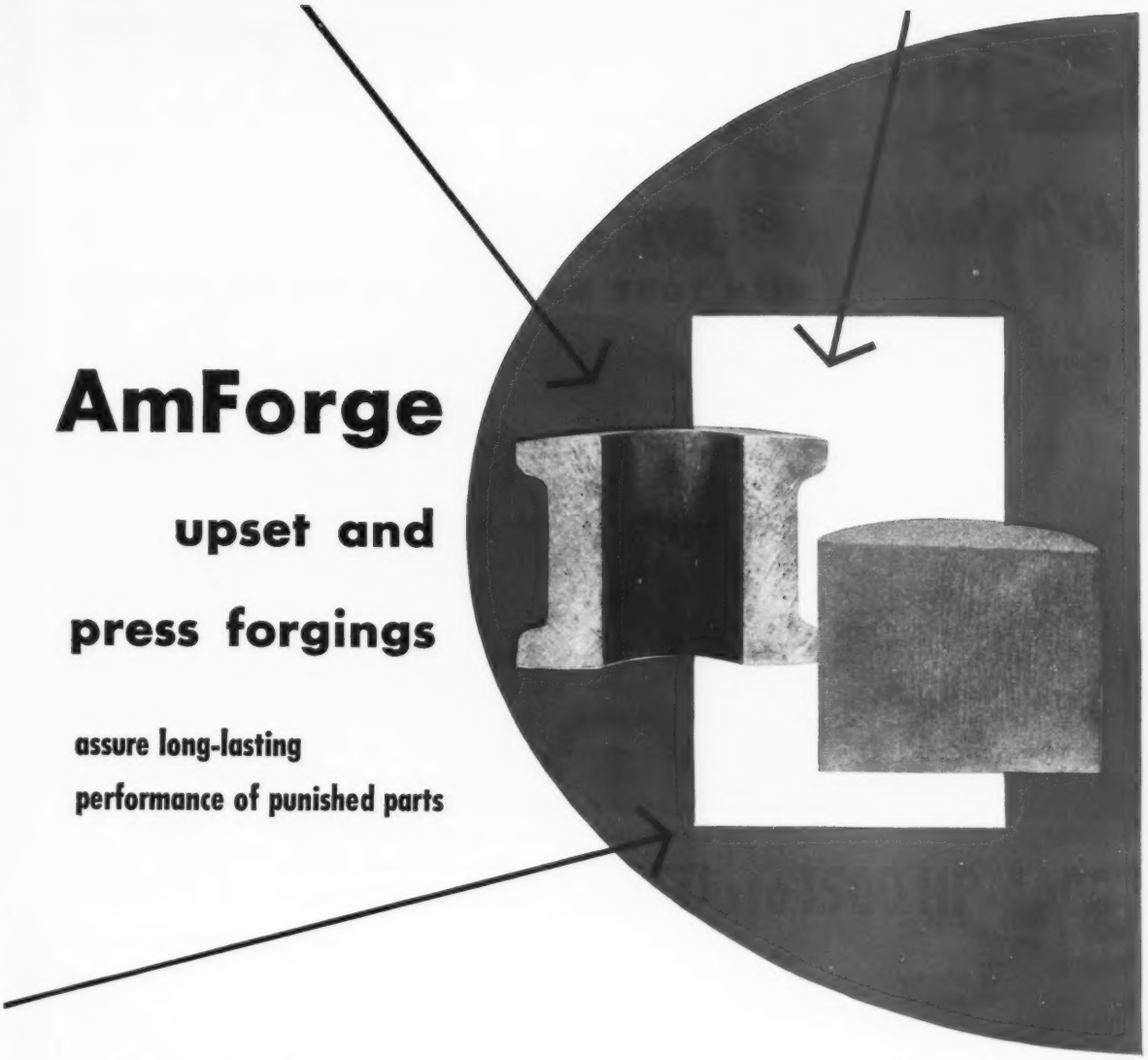
North American at Fresno was set up in November 1951 as a modification center and is currently concerned with the repair, remanufacture, and modification of F-86 Sabre jets. Over the past two years the center has undertaken work for the Air Force, Navy, National Guard, and 22 friendly foreign nations.

AIR VIEW of the 34 buildings with a floor area of 300,000 sq. ft. comprising the Fresno operations of North American. The installation, located at Fresno Air Terminal, is leased from the city of Fresno.

AmForge

upset and press forgings

assure long-lasting performance of punished parts



The choice of the right method of producing a metal part can often mean the difference between a tough, long-lasting product and one of mediocre quality. This spool, used in the tilting mechanism of heavy duty dump trucks, had to be made to take punishment. Naturally, a forging was called for. But what kind? AmForge engineers studied the problem and recommended the Upset method. Not only could a 2½-inch hole be formed right in the piece with the Upset process thus saving 5 pounds of material to cut down on drilling time later, but also seven additional pounds of stock were saved, compared to turning out spools from five-inch stock with the old method.

At AmForge's new Upset and Press plant in Azusa, California, you can get advantages similar to this example. In many instances, AmForge experience and facilities can result in better physical characteristics. AmForge Steel gear blanks, for instance, being denser in structure, and having a radially upset grain, will machine more uniformly, show greater resistance to distortion in heat treating and result in a uniform, maximum strength to all teeth.

Send us a sketch, blueprint or sample for an estimate. No obligation, of course.

AMERICAN **Brake Shoe** COMPANY

AmForge Division

109 N. WABASH AVENUE, CHICAGO 2, ILLINOIS

PLANTS: AZUSA, CALIFORNIA • CHICAGO, ILLINOIS

NOBLE CRANES

Let Noble give you a lift

WITH YOUR MATERIAL HANDLING PROBLEMS

Every day, Noble Company engineers are designing overhead traveling bridge cranes and special type gantry cranes for handling a multiformity of loads, many of which require very precise control of movement. Whether your job is complex or simple, for assembly work or overhead transporting and loading of materials, your crane must be designed for complete dependability and safety and low overall operating cost as well as first cost.

We would like to send you a copy of our new catalog. Make your request in writing please.

Let the men who know how design and build that overhead crane for you. They have the 'know how' that can be attained only through years and years of experience in designing and building cranes of all capacities and types.

C18

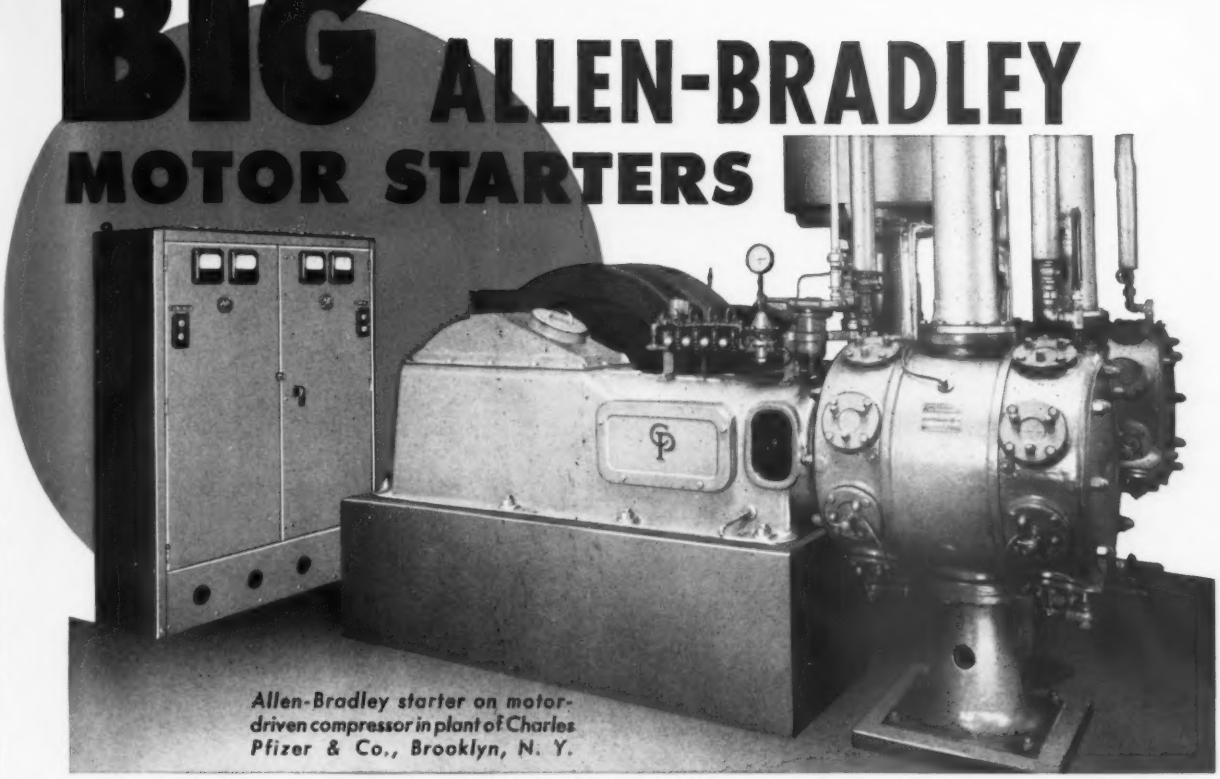
Our crane engineering staff is available for consultation and can provide valuable assistance in planning both methods and types of equipment to meet your particular needs.

NOBLE COMPANY

1860 SEVENTH STREET • OAKLAND 20 CALIFORNIA

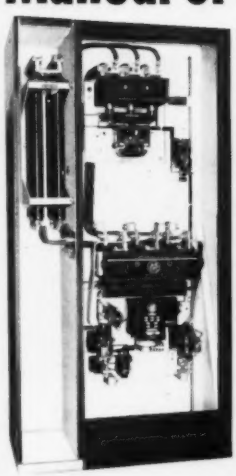
OVERHEAD MATERIAL HANDLING EQUIPMENT

BIG ALLEN-BRADLEY MOTOR STARTERS

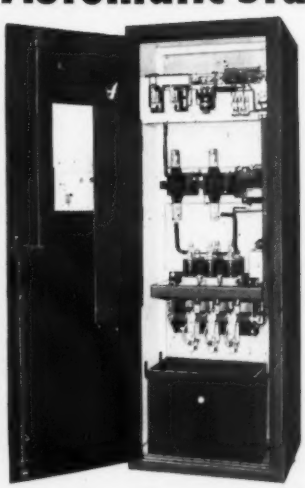


Allen-Bradley starter on motor-driven compressor in plant of Charles Pfizer & Co., Brooklyn, N. Y.

Manual or Automatic Starters Up to 1500 HP-4600 V



Bulletin 740 Size 6 resistance starter with adjustable graphite disc compression resistors.



Bulletin 1109 high voltage across-the-line squirrel cage automatic motor starter. Has 3-pole oil immersed contactor.

Overload Protection—Two thermal relays provide reliable and accurate overload protection. Always accurate . . . always on the job.

Out-of-Step Relay—The squirrel cage winding of synchronous motors is provided for starting only, and is susceptible to injury through overheating if the motor operates at subsynchronous speed for more than the safe allowable starting time. An out-of-step relay is therefore provided on all A-B synchronous motor starters. The relay is a fluid dashpot type of time delay overload relay.

BIG MOTORS need dependable starters with trouble-free contactors, relays, and current limiting fuses or circuit breakers. To meet the demands of large motor-driven machines, Allen-Bradley has developed a line of 14 different types of across-the-line and reduced voltage starters . . . for motors up to 1500 hp.

Each type comes in a wide range of horsepower and voltage ratings . . . either manually or push button operated. Every big Allen-Bradley starter consists of time-tested components that have established their individual reputations for quality and trouble-free performance.

At maximum rating, these big starters have an interrupting capacity of 10 times motor full load current. These starters are designed to be self-protecting against short circuits up to 150,000 kva on 2000-2500 volts or 250,000 kva on 2501-4600 volts.

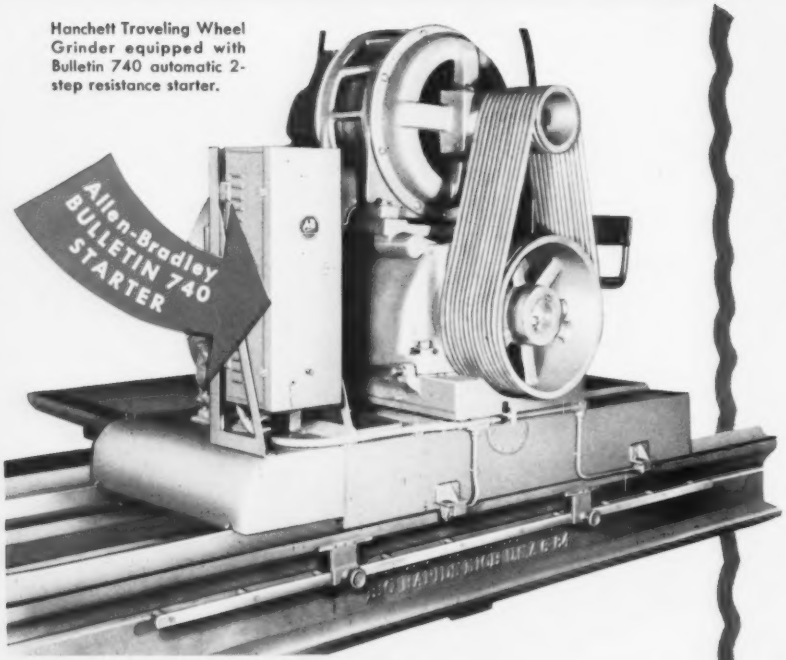
Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wisconsin

5-54-M

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

1954

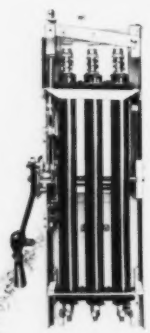
When You Need a Reduced Voltage Starter



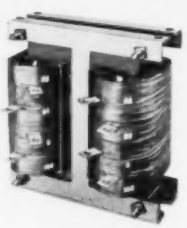
Hanchett Traveling Wheel Grinder equipped with Bulletin 740 automatic 2-step resistance starter.

Here Are 6 Allen-Bradley Starters . . . All Different

To satisfy the varied starting requirements where a reduced voltage starter is either necessary or desirable, 6 types of Allen-Bradley reduced voltage starters are listed here. They will start spinning frames, big presses with heavy flywheels, and chain or gear driven machines without jerk or jolt. For more complete data, please send for Allen-Bradley Handy Catalog—6th Edition.



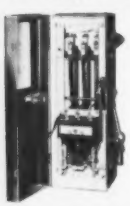
Rear view of Bulletin 640 manual compression resistance starter (removed from cabinet) showing 3 resistor tubes that are filled with graphite discs. Pressure is gradually applied on discs with hand lever which lowers the starting resistance until the motor and the machine accelerate with velvet smoothness.



Autotransformer with 50, 65, and 80% reduced voltage taps used in Bulletins 646 and 746 autotransformer type starters.

MANUAL—COMPRESSION TYPE

Manual compression resistance starter up to 200 hp, 220-440-550v. Graphite discs in the insulated tubes are compressed with the hand lever for stepless speed control. Ideal starters for chain or belt drives. Overload relay protection.



BULLETIN 640

MANUAL—TRANSFORMER TYPE

Manual transformer type starter up to 125 hp, 220v; 250 hp, 440-550v. Air break or oil immersed contacts. Automatic reset overload relays. Time delay mechanism determines proper time interval for manual switch-over of hand lever.

BULLETIN 646

AUTOMATIC—TRANSFORMER TYPE

Automatic reduced voltage starter up to 300 hp, 220v; 600 hp, 440-550v. Timing relay controls the accelerating time. Operator touches Start button—the starter does the rest. Available in standard, watertight, and dusttight enclosures.

BULLETIN 746

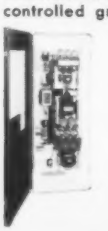
AUTOMATIC—2&3 STEP COMPRESSION

Automatic resistance starter with preset adjustable graphite resistors up to 200 hp, 220-440-550v. Push button closes starting circuit through resistors. Later, timing relay closes running contactor and cuts out the starting resistors.

BULLETIN 740

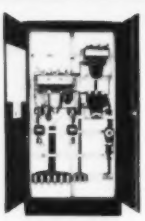
AUTOMATIC—STEPLESS TYPE

Fully automatic resistance starter with solenoid controlled graphite disc resistors up to 300 hp, 220v; 600 hp, 440-550v. Stepless control of current and speed. Acceleration adjustable to avoid lamp flicker. Overload relay protection.



BULLETIN 742

AUTOMATIC—MULTI-POINT



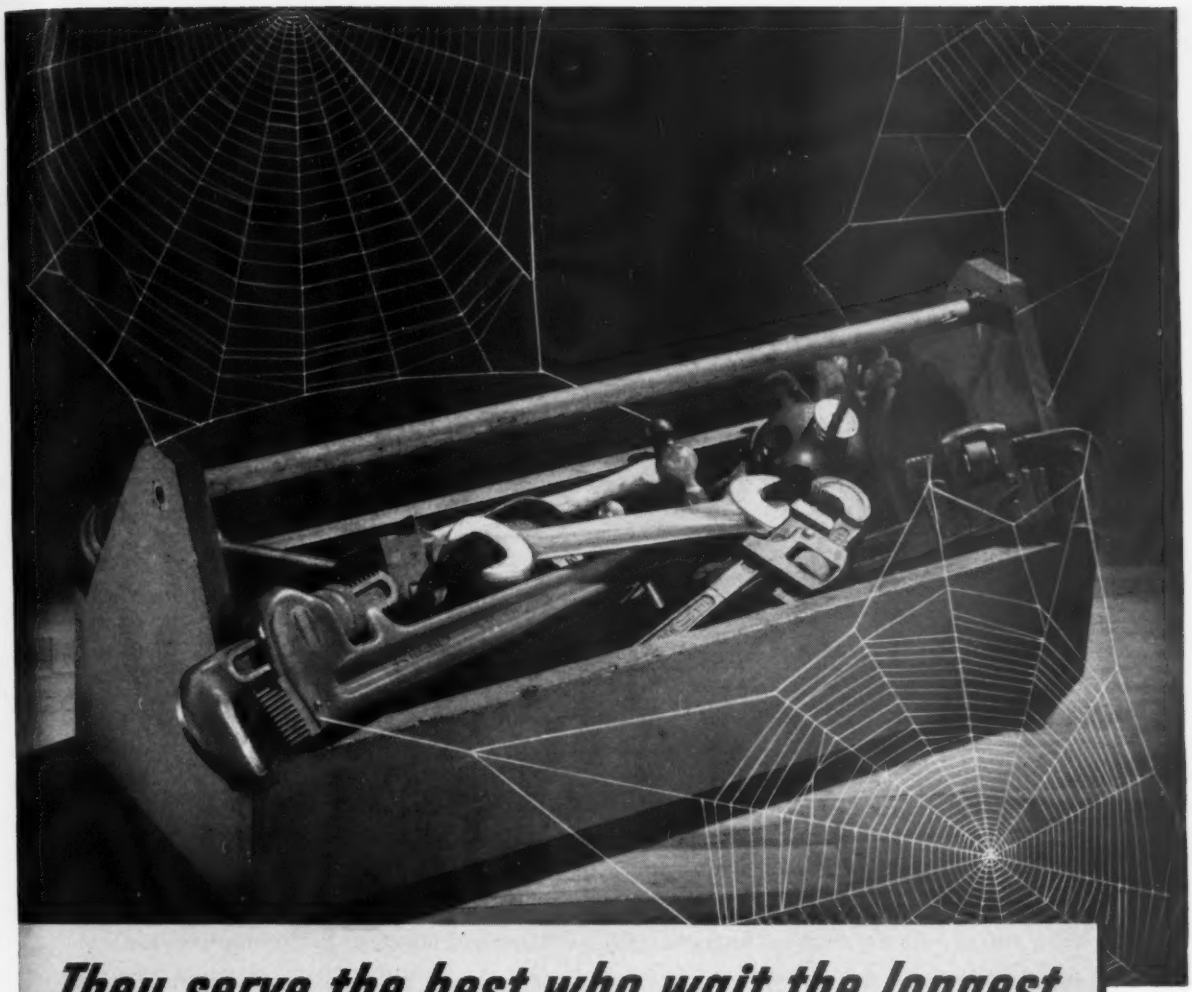
Automatic resistance starter up to 300 hp, 220v; 600 hp, 440-550v. Resistors easily adjusted for ideal starting of motors on power networks. For more than 4-point control, use Bulletin 742 starter.

BULLETIN 741

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.

ALLEN-BRADLEY
REDUCED VOLTAGE STARTERS
QUALITY

5-54-M



They serve the best who wait the longest

Here's one place where cobwebs would be strictly OK—on a piping maintenance man's tools. For the less they have to work, the lower your maintenance costs.

Excessive valve maintenance is serious simply because the average plant has so many valves. So it's sound economics and good business to buy quality and low maintenance rather than "bargains" and frequent maintenance.

Naturally, the thrifty buyer always chooses quality valves, and for biggest value he insists on Crane. There's no greater assurance of dependable, low-cost performance . . . and the Crane line provides such quality in valves for every need.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

will your suppliers carry you...

if trouble comes?

No one can tell when adversity may strike —it could be a fire, a national emergency or an industry slump. Most of us tend toward the bright side and don't often think of the importance of financial or technical aid as a consideration when choosing a supplier. But most men of experience agree that it is important to do business with firms that not only have the interest but the ability to carry you in an emergency.

On no less than two occasions—the Great Chicago Fire and the Panic of 1893 —our own company would have been out of business had it not been for the cooperation of our sources of supply. So, we speak from experience when we attest to the value of good dependable sources. They may mean the difference between success and failure.

The Ryerson Company, through over 100 years of business, has been privileged to help many firms when the going was rough. So, whether it is just steel in a hurry or help when it counts most, call on Ryerson. You will not be disappointed.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot & cold rolled, many types & coatings
TUBING—Seamless & welded, mechanical & boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
REINFORCING—Bars & Accessories, spirals, wire mesh
BABBITT—Five types, also Ryertex plastic bearings
MACHINERY & TOOLS—For metal fabrication

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ANNUAL PLANT & MAINTENANCE ISSUE

JUNE 1954

Western Industry

MAINTENANCE . . . . What is it? Who does it?

A symposium of experience and ideas prepared especially for Western Industry by the Plant Engineers Society of San Francisco

YOU can sell preventive maintenance to management if you can prove, by means of records, that maintenance pays its way in smoother operation and a better product, reduces down time and production costs.

Typical of studies that can be made to substantiate the case for a more comprehensive program is the careful scrutiny of your lubrication procedure. Is it well planned? Is it adequate? How often is equipment failure due to lack of proper lubrication? Is the proper lubricant specified? Is lubrication frequency correct and are proper facilities provided for lubrication men?

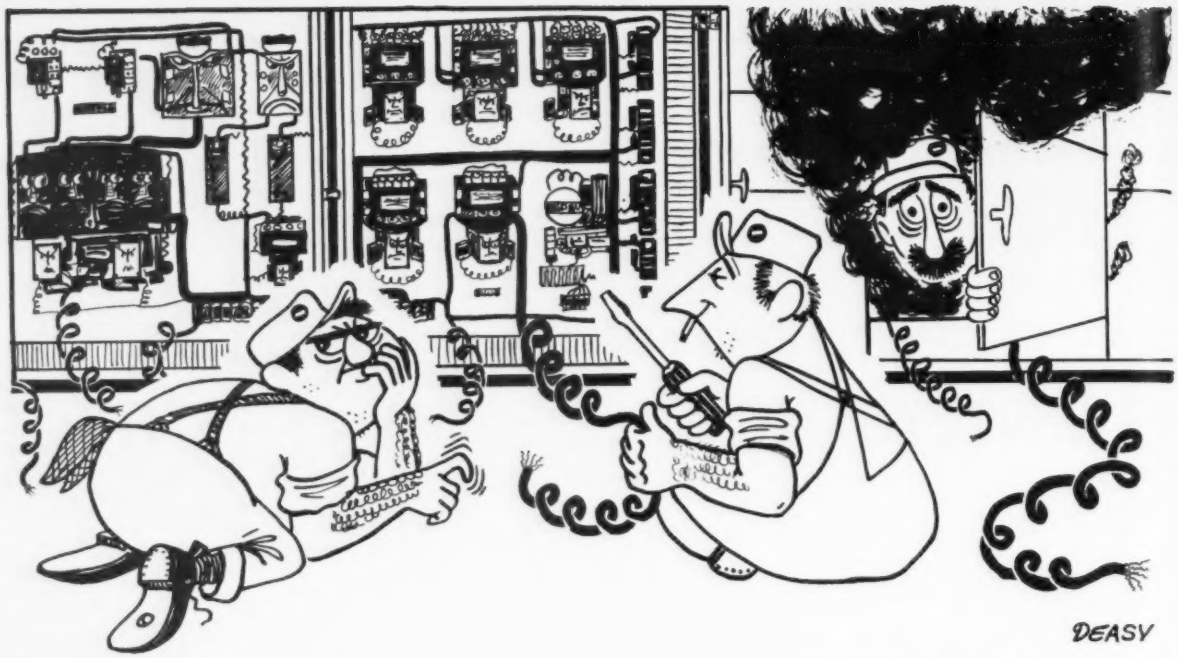
Records of one Western foundry disclosed that one man spent 40 hours a week servicing air tools, but examination of the tools revealed the noticeable lack of oil. Further examination showed that oiling practices consisted of pouring oil into tool barrels from open containers which were scattered about the shop.

Oiling frequency depended on initiative of the tool operator and the supervision of the departmental foreman. Solution to this problem was fairly simple but yielded important savings.

Automatic oilers were installed in the air lines attached to the tools and a supervised program of filling the automatic oilers was instituted. Maintenance of air tools dropped to four hours per week, this being the amount of time required to repair damaged tools and hose caused by rough handling. One man was freed for other work, since the lubrication man was put on the schedule where it took only one hour per day to take care of all the oiling devices.

Well-kept maintenance records can also provide a ready answer to questions of excessive motor failure. Are motor burn-outs caused by lack of scheduled cleaning? Are motors fail-

IF you find your air tools (left) and motors (right) being serviced like this, then it's time to set up a maintenance program.



LOOKING after your controller panels just sort of casual like, as seems to be happening here, will cause your costs to shoot up and that's for sure. Periodic contractor overhaul is a good cure for this trouble

ing because electric controllers are not serviced periodically? Are motor bearings over or undergreased?

Again let us cite an actual case. A machine shop found that six to eight motor failures were occurring every month, and in each case of failure it was found that motors were dirty. Bearing seals had been broken by excessive grease being pumped into grease housings; the result was grease forced into the windings. Some motors were single phasing due to infrequent motor controller inspection.

The solution: motors were put on a periodic cleaning program and controllers were serviced at the same time. Sight oilers were installed on sleeve bearing motors. Openings to ball bearings had pipe lugs inserted and motor greasing was put in the standard lubrication schedule.

Lubrication men were given detailed instructions on proper greasing methods and types of grease. Grease guns that could be filled only by means of a pump inserted into a sealed container were provided, and motor failures were reduced to approximately three per year.

Under the new preventive maintenance program, production was increased, since down-time on machines was planned for slack production periods. Savings in rewinds paid for one electrician's wages. Inventory on spare motors was reduced, as was that of repair parts and bearings. And cost figures showed that it was most economical to clean motors on weekends at overtime rates when motors were constantly busy on weekdays.

Controller panels

A look at the records may also reveal loss of production caused by electrical controller panel failures or malfunctioning.

In another machine shop certain machines with complex motor controller panels were causing excessive stoppages of work for electrical adjustments. A complete, periodic contractor overhaul program was put into effect, including the complete stocking of required spares, contacts, and moving parts.

Thorough cleaning, disassembly of relays, and replacement of worn and burned parts cured the shop of failing controller panel troubles. After the program had been in full swing for a year, it was found that one less electrician was needed for the crew.

What sort of plan will prove that good preventive maintenance is a money saver? What records should be kept, and how should they be set up?

Consensus of opinion indicates that "the proof of the pudding is in the eating." To prove the value of good preventive maintenance, a basis of comparison must first be established. Establishment and maintenance of adequate records and a good cost accounting system appear to be of the utmost importance. The system of cost accounting records in order to be effective must speak a language that management can understand. Included should be the following cost data for (a) operations with maintenance when absolutely necessary, or (b) preventive maintenance periodically:

1. Maintenance labor costs.

2. Maintenance material cost and machine and equipment replacement costs.

3. Cost of end products damaged or scrapped, attributable to lack of necessary maintenance.

4. Cost of machine, line, process, or plant shutdowns due to lack of necessary maintenance.

These costs (and possibly others) should be accumulated and presented graphically to point up the difference in cost of operation with maintenance only when required, and with periodic preventive maintenance. The period of cost accumulation should probably be not less than one year.

Parts display

Another way to prove that a good preventive maintenance program is a money saver is by arranging a display of worn parts which have been replaced before a breakdown occurred. These parts should be tagged to indicate from which machine the part was removed and in which department the machine was located.

A check list, used as a basis for preventive maintenance inspection, should be displayed adjacent to the tagged part, and the plant controller should be asked to assign a cost analyst to compute the savings resulting from scheduling the replacement of worn parts before breakdown resulted in loss of productive time.

The plant manager should be prepared to discuss his preventive maintenance program and the benefits resulting from it at an annual cost meeting. The discussion should be broad enough so that specific examples of benefits from the program can be pointed out to each department in the plant, indicating how loss in production was avoided. Finally, these total benefits to the plant for the year can be summarized to show the dollars and cents saved.

Although preventive maintenance as a money saver is basic and fundamental to the plant engineer, he must remember that management necessarily views maintenance as a continual cost that provides no tangible revenue. Often preventive maintenance can be sold only through a process of gradual education, using as many facts as can be obtained from detailed records of equipment and repair costs, installation and repair times.

The basic factor of a preventive maintenance program is records. Considerable care must be taken to keep the records simple, and at the same time detailed enough to yield all the information required to maintain the maintenance program. Even the most elementary notes or records, however, should show that a planned maintenance program, even if inadequate, will save money.

Knowing machinery basic

Although a good preventive maintenance program stands or falls on the strength of its records, plant engineers know that good maintenance begins with the fundamental knowledge of machinery and its peculiarities, and a good oiling and lubrication system. The basis for your program can be a checking schedule for each different type of equipment with allowable tolerances. When these tolerances are approached, an overhaul should be scheduled.

A plant engineer in charge of making cotton battens from baled cotton indicates that he is responsible for large motors that must work continuously in dusty conditions. These he has cleaned, checked, and greased

CLOSE coordination pays off. Before a maintenance man at Marchant Calculators, Inc., adjusts pipe on new automatic plater, Henry Wood, plant engineer, checks the blue print.

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Berkeley

(This is the only section of the Society west of Chicago. Plant engineers desiring further information are invited to communicate with any of the officers of the San Francisco section.)

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Contributors to this symposium included the following:

K. Buckley, plant engineer, U. S. Naval Shipyard, S.F.
W. H. Graham, Jr., plant engineer, Simmons Co., S.F.
A. W. Kissner, plant engineer, Ford Motor Co., Richmond
W. E. Lawrence, plant engineer, Griffin Chemical Co., Richmond
Keith Leonard, assistant plant engineer, Willys Motors Div., Richmond
Geo. Merrill, plant engineer, MJB Co., San Francisco
R. H. Morey, plant engineer, Pacific Paint & Varnish Co., Berkeley
K. Paulson, formerly plant engineer (now mgr. of real estate and communications), Bethlehem Pacific Coast Steel Corp., Shipbuilding Div., San Francisco
R. Pleski, plant engineer, Willys Motors Div., Richmond.
F. Reeve, assistant plant engineer, General Metals Corp. Enterprise Div., S.F.
F. M. Reibin, plant engineer, General Metals Corp. Enterprise Div., San Francisco
F. Schleimer, plant engineer, Duart Manufacturing Co., Ltd., San Francisco
Henry Wood, plant engineer, Marchant Calculators, Inc., Emeryville

CLEAN, orderly lubricants room at General Metals, Enterprise Div. New approved safety containers, up-to-date pumps, no open containers. Inset: Drum cover type grease gun fillers prevent contamination of grease.

yearly during either the two-week vacation period or the December inventory. Other important machinery in the cotton rolling mills is also torn down, checked, and bearings are replaced. Since this system was inaugurated about seven years ago, he has not had a single lost time expense due directly to poor maintenance.

Records

To obtain the information needed to analyze costs of operation, it is necessary first to have a good record system. Such a system should consist of the following elements:

1. Accurate data on every piece of equipment in the plant.

2. An identification number should be assigned to each piece of equipment, which is tied back to the record file.

3. The equipment file should contain all service manuals, operating manuals, electrical wiring diagrams, and even production data indicating loadings, speeds, sequence of operations, etc.

4. Equipment files should contain a record of all work and revisions made on the machine, including hours of labor, overtime hours, types of repair, hours spent on preventive maintenance.

5. The file should show repair and overhaul parts purchased, the cost of these parts, which parts are susceptible to the most damage or wear, and which parts should be kept in stock.

6. A file for motors, generators, and batteries should be set up, containing foregoing information. Each piece of equipment should carry an identification number which should be cross-filed with the equipment it serves. The particular function of the motor and generator should be noted.

7. Parts lists for all electrical apparatus should be filed with the piece of equipment with which they operate. A record of parts purchased, cost of parts, and those requiring frequent renewal should be included.

8. Lubrication data and servicing schedules should be kept.

9. The name, telephone number, and address of the manufacturer's representative for each piece of equipment should be in the filing system.

10. A file of manufacturers' catalogs should be assembled for securing information on maintenance products and manufacturers. These might be cross-indexed by subject and by manufacturer's name. Each catalog should show the local vendor's name and address.

These ten points can by no means contain all the types and subclassifications of records that might serve a maintenance department or a plant engineer, but experience has shown that the system must be as fast and simple as possible. Some plant engineers and management may conclude that a record system as described here will take too much manpower to maintain. Some accounting departments are reluctant to include maintenance work orders for costing as additional work. It is found, however, that in most instances a well planned filing system of records can be kept up by one clerk, who can also handle other clerical work.

All records should be periodically reviewed to see if they are up to date, need improvements, simplification, or elimination. This review should be on a quarterly basis in an informal manner, and a thorough check should be made semiannually or at least once a year.

Records will reveal excessive breakdown, overloading of equipment, and unreasonably high repair costs. Records showing the experience the firm has had with various items should be used in writing specifications for new equipment so that machines will meet job and safety requirements without extra work to be done at the customer's plant.

How does the plant engineer permanently convince management that a full maintenance staff is necessary? Should he work with them in the purchase of equipment that his experience shows will stand up best?

There is no pat answer to getting and keeping management's permanent cooperation with maintenance. Sometimes management is easy to sell, sometimes it is hard. The most successful methods employed, however, stress continually emphasizing the benefits of scheduled inspections of equipment to minimize break-

HALF the battle in maintenance is to have what you want when you want it, instead of down-time while you send out. This demands a well-supplied stock room, like this one at the Ford Motor Co.'s Richmond plant.

downs. Every opportunity should be taken to impress upon management the importance of maintenance and its position in maintaining smooth production. If a plant engineer can convince himself that an idea will pay, he has a much better chance of getting this idea across to management.

A comparative cost study of productive manhours lost and freqency of breakdown before and after preventive maintenance serves as a handy yardstick which management can understand. Management must know what new equipment costs, also what breakdowns cost. The establishment of basic records will soon show where needless money is being spent. With these records as ammunition, plant engineers can back up a well thought out program for preventive maintenance, and management is more likely to give its approval.

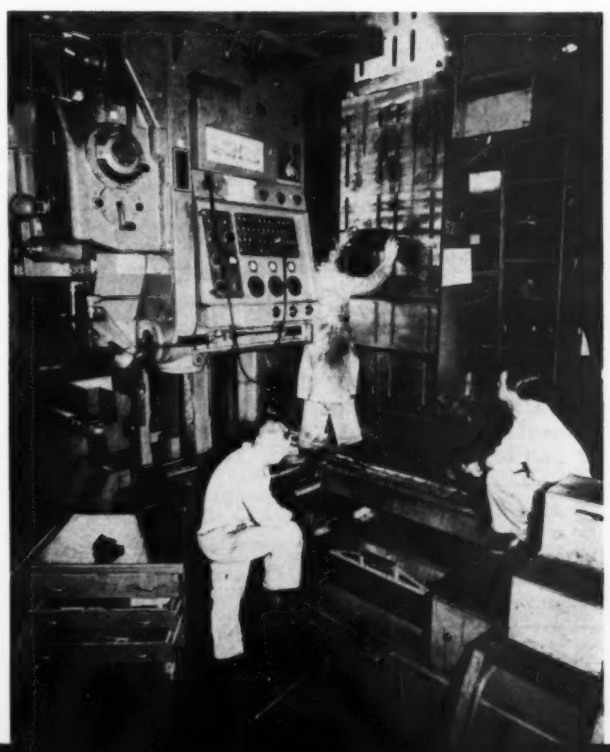
In order to get the permanent cooperation of management, the easiest approach might be to first sell them on the idea of a trial of the two systems of maintenance, corrective or preventive, in two comparable sections of the same plant. At the end of a suitable period of time (a year or more), the preventive maintenance system should sell itself from a cost viewpoint. Original selling of the idea can be supported by cost studies made by other firms which have compared the two systems.

If top management is really tough, try this:

Keep records of large maintenance expenses on certain key pieces of equipment that management knows make your bread and butter. When management starts to curtail expenditures, ask them if they want to repeat an expenditure of such and such, reminding them what happened last time, and how they had to get New York approval before spending the money. This "big stick method" must be used sparingly but will usually get approval.

Justification of a permanent maintenance staff requires that an adequate work flow chart be drawn up showing what work will be done and the number of men required to do the job. It is necessary to show management the time required for the maintenance staff to complete each check sheet and establish the number of people on each job to carry out the work load.

PREVENTIVE maintenance keeps expensive repairs down to minimum. Machine tools at Willys Motors Div., Richmond, are checked every six months and re-aligned if necessary, as this Keller machine is undergoing.



Needed in purchasing

It is generally agreed that the plant engineer should work with management in the purchase of equipment that his experience shows will stand up best. In fact, it is the plant engineer's responsibility to recommend to management preferred types of equipment and methods for satisfactory operation and plant use. Smart management often has the plant engineer as part of the buying team, along with the purchasing agent, for recommending to the plant buying crew those items which, in his experience, are most satisfactory.

In order to prove that a preventive

. . . MORE ON PAGE 83

TOO much flour, grease and dirt: stator windings finally burned out.

WHY MOTORS BURN OUT

Here are the main causes

1. Foreign materials comprising either dirt, grease, water, chemicals, or dust and other abrasives.
2. Single phasing of three phase motors.
3. Bearing failures.
4. Miscellaneous, including:
   a. Overloads
   b. High ambient temperatures
   c. Defective rotors or rotor failures
   d. Wrong voltage
   e. Excessive vibration

IT is unfortunate, but appallingly true, that about 25% of all electric motor burn-outs fall into the category of foreign materials. The obvious remedies for damage by foreign materials include the totally enclosed motors where practicable and periodic inspection and cleaning.

It may seem surprising to some, but repair shop experience proves that approximately 13% of all three phase motor burn-outs are caused by single phasing, which may result from loose connections at the motor terminals, in the magnetic switch or the disconnect switch, and from a blown fuse. Single phase burn-outs usually can be easily recognized because only one-third or two-thirds of the winding is burned, depending upon whether the stator windings are connected delta or wye.

Some considerations which will aid in keeping single phase burn-outs at a minimum are:

1. Careful installation of fuses to assure good contact at the fuse clips.
2. Periodic checking and adjusting of the contacts on magnetic starters.
3. Periodic checking and tightening of bolted connections in the control circuits.
4. Careful selection of the proper sized relay heating elements in the magnetic starter.

Bearing failures in electric motors account for approximately 8% of all burn-outs. Those of us in the repair industry are surprised at the frequency of the neglect of both ball and sleeve bearing maintenance in many industrial plants. This is even more astonishing when it is realized that motor bearings are not usually difficult to maintain if a few simple principles of good maintenance practice are understood. It is probably the lack of knowledge, rather than lack of desire or initiative, which causes so many bearing failures.

Some of the common causes are:

1. Over-lubrication.
2. Lack of lubrication.
3. Contamination of lubricant in the bearings by foreign materials.
4. Misalignment of the motor.
4. Misalignment of the bearings within the motor.
6. Belt or chain tension too tight.

Over-lubrication, especially of ball bearings, is, at least from our experience, the most prevalent. Excessive lubrication produces additional friction and consequent temperature rise of the bearings during operation. Over-lubrication of the bearings also results in the motor windings becoming saturated with grease and oil, which deteriorates and shortens the life of the electrical insulation, eventually causing a burn-out.

The results of lack of lubrication are self-evident, although the extent of damage is not always brought to light. Accompanying illustrations will forcefully illustrate the damage.

Regarding misalignment of motors and misalignment of bearings in their housings, it must be emphasized that extra caution should be used to assure proper alignment so that damaging results may be avoided.

Editor's note: This article is based on a talk by Mr. Larsen before the Electrical Maintenance Engineers Association of Southern California.

By
GEORGE LARSEN
Electrical Engineer
Larsen-Hogue Electric Co.
Los Angeles

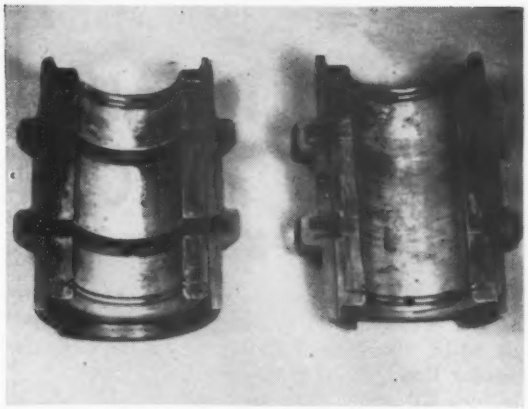
Many times belt and chain drives are installed with excessive tension on the belts or chain. When this occurs, an additional and unnecessary load is imposed upon the bearings. While ball bearings will stand this type of abuse reasonably well because the balls and races rotate to evenly distribute the wear, a sleeve bearing will not. All the friction wear must be absorbed over a very small angle on the circumference of the bearing.

Foreign materials such as dust, dirt, water, chemicals, etc., filtering into motor bearings is a large cause of bearing failure. Water causes grease to emulsify or break up into minute individual particles, which results in its losing its viscosity and lubricating qualities. Also water subjects bearings and housings to rust.

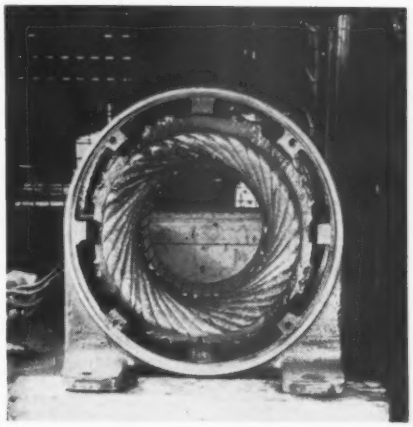
The use of Class B (glass) and Class H insulation will largely relieve the troubles caused by overloads and high ambient temperatures.

Many times periodic visual inspection of copper bar rotors will reveal small cracks which can be repaired before more serious trouble develops. However, this is not always practicable during continuous operation. The damage to and performance of the motor becomes progressively worse. The motor loses torque and speed as more bars open up. This will cause additional heating and eventual stator burn-out if the motor is fully loaded.

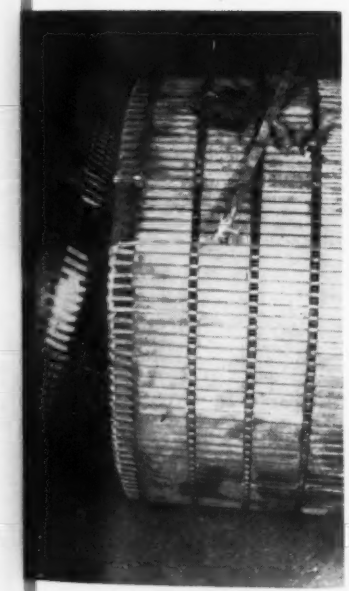
(LEFT) Vivid example of overlubrication, a frequently occurring offense. Causes bearings to heat up, saturates windings.



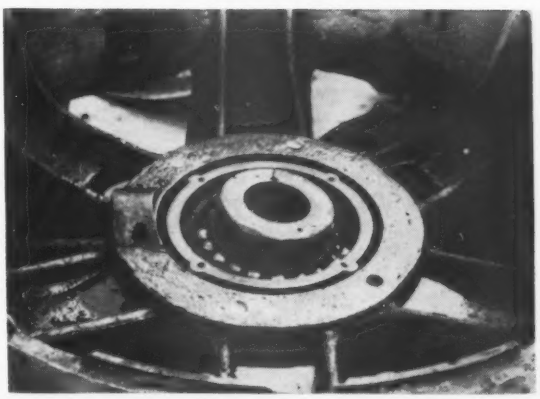
(RIGHT) Split type sleeve bearing failure because belt tension too tight. Excessive wear is shown on top half (at left).



(RIGHT) Single phase burn-out on a delta connected stator. Easily recognized because only one-third of winding is burned.



(LEFT) This is what happens when open rotor bars are left unrepaired. Should be periodically inspected visually if possible.



(RIGHT) Complete destruction of both bearings and bearing housings, also burn-out of windings caused by lack of lubrication.

(LEFT) Another example of lack of lubrication. Extent of the damage from this cause is not always brought to light.

(RIGHT) Emulsification action of water on bearings is shown here. Water causes grease to emulsify and lose viscosity.

BIG MAINTENANCE SHOW and CONFERENCE

THE West's first maintenance show and conference in Los Angeles July 13-15, (conference at the Ambassador Hotel, show at Pan-Pacific Auditorium) promises to be highly rewarding in opportunities to see the latest in equipment and listen to the latest in ideas and methods.

For the conference, the program speaks for itself: three levels aimed at management, supervisory and technical—with sessions devoted to special industries of the West. The program summarized is as follows:

July 13

Opening remarks by the conference chairman, L. C. Morrow, consulting editor of *Factory Management and Maintenance*.

10 a.m. to 12:30 p.m. Three concurrent meetings:

1. Principles of maintenance organization and management: lecture by Maurice Olchoff, plant engineer, Des Moines factory of Solar Aircraft.

2. Planning and scheduling maintenance operations: George J. Martin, manager mechanical division, National Biscuit Co., New York.

3. Training of maintenance personnel: J. M. Forrest, superintendent of maintenance and construction, Dow Chemical Co., Pittsburg, Calif.

2 p.m. to 4:30 p.m. Four concurrent sessions:

1. Inspection procedures and frequencies: B. L. Peak, plant superintendent, Sterling Electric Motors, Los Angeles. Chairman, Bernard J. Bannan, general manager, Western Gear Works, Lynwood.

2. Aircraft industry problems: C. M. Vigil, general foreman of maintenance, Douglas (El Segundo). Chairman: Roy Fisher, chief plant engineer, Rheem Manufacturing Co. (Downey).

3. Electrical equipment: Discussion leaders, L. A. Beck, manager, Southwest Pacific Service Shop, General Electric Co., Los Angeles; Philmore Belsky, switchgear engineer, Westinghouse, Los Angeles; James Roy Jones, regional engineer, lamp division, Westinghouse, Los Angeles. Chairman: Byron Hill, plant engineer, Cannon Electric Co., Los Angeles.

4. Metal working plants: Chairman, Don L. Newton, works manager, Kwikset Locks, Anaheim. Discussion leader, James M. Weeks, plant engineer, Plomb Tool Co., Los Angeles.

July 14

9 a.m. to 11:30 a.m. Four concurrent programs:

1. Maintenance problems of the small plant (with 25 or fewer maintenance employees): C. A. Gallaher, plant engineer, Robertshaw-Fulton Controls (Anaheim). Chairman, A. C. Prendergast, editor, WESTERN INDUSTRY, San Francisco.

2. Lubrication: Arthur Zobell, plant engineering supervisor, North American Aviation (Los Angeles International Airport); J. H. Frier, lubrication engineer, Kaiser Steel Corp., Fontana; R. C. Sullivant, assistant plant engineer, Exchange Lemon Products Co., Corona; Homer M. Eversz, plant engineer, McCulloch Motors Corp., Los Angeles, Chairman, J. D. Garrick, maintenance superintendent, C. F. Braun & Co., Alhambra.

3. Petroleum processing plant maintenance: Arthur E. Storm, chief project planner, Tide Water Associated Oil Co., Associated, Calif. Chairman, George Snyder, superintendent of maintenance, Union Oil Co., Los Angeles.

4. Food processing plant maintenance: J. S. Hutchison, chief engineer, Exchange Lemon Products Co., Corona; Bruno Pilorz, former chief operating engineer, California Packing Corp., San Francisco. Chairman, C. G. Beisel, head of development division, Exchange Orange Products Co., Ontario.

The registration fee for the entire conference is $10. Hotel reservation requests should be sent to Western Plant Maintenance Conference headquarters, at the Ambassador.

First affair of its kind in the West

Solutions to maintenance problems peculiar to the West and its specialized industries, such as food processing, petroleum, aircraft, electrical, metal-working, paper and paper products, will be featured in the exhibits at the First Western Plant Maintenance Show at Pan-Pacific Auditorium, Los Angeles, July 13-15.

From 125 to 150 exhibitors will participate, and the show is expected to compare favorably with those that have been held for several years in the East.

Hours for the show are:
Tues., July 13:
11 a.m.- 6 p.m.
Wed., July 14:
11 a.m.-10 p.m.
Thurs., July 15:
11 a.m.- 6 p.m.

Posters for plant bulletin boards advertising the show may be obtained from the producers of the show, Clapp & Poliak, 759 Monadnock Bldg., San Francisco.

(See page 78 for exhibitor's list.)

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E. R. Cluff, Vice President, General Paint Corporation, San Francisco.
F. C. Devine, Manager, Public Relations & Advertising, Turco Products, Inc., Los Angeles.
E. M. Ellis, Manager, Pacific Southwest District, Apparatus Sales Division, General Electric Company, Los Angeles.
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C. Glenn O'Donovan, Exhibit Manager, United States Hoffman Machinery Corporation, New York.
J. A. Ransford, Asst. Wholesale Sales Mgr. Tide Water Associated Oil Company, San Francisco.
R. L. Saling, Pacific Coast District Maintenance Supervisor, Westinghouse Electric Corporation, San Francisco.
P. L. Symons, Vice President, Albina Engine & Machine Works, Inc., Portland.

MORE COSTLY THAN FIRE is lack of paint

By GANO F. CULWELL, Industrial Painting Contractor, Los Angeles

Save the surface and you prevent decay and corrosion of wood and metal

INDUSTRIAL maintenance painting is finally coming into its own in some industries. To the surprise of many people, the actual loss each year by deterioration of wood and metal surfaces through lack of care and proper protection exceeds that of fire losses of every kind.

Although no thicker than a few sheets of paper, paint coatings are more durable than some metals at equal thickness, and paint protects billions of dollars in wood and metal structures from decay and corrosion.

Many industrialists also are coming to recognize the specific advantages of properly maintained factory interiors in raising of morale, increasing efficiency, and bringing about a more harmonious employee-employer relationship.

Certain combinations

Certain color combinations have been proven of special value to employees because of the added ease and comfort as well as clear, restful vision in the atmosphere of a properly painted factory, machine shop, or warehouse, in comparison to a drab, dreary, dark interior.

For instance, a machinist doing close work at a machine is obliged to look for a certain period of time at the work at hand, or the machine, and when the workman has an opportunity to lift his eyes from his work, a restful green or yellow proves much more valuable to his wellbeing than a dark, dirty, or completely unpainted surface.

Of course, food processing industries are required by law to maintain a certain standard of sanitation which is specified to be accomplished by painting. But our heavier industries, such as steel, lumber, machine shops, foundries, and other metal

FIRST step is protection of fluorescent lamps, lathes, benches, other objects, and merchandise from falling dirt, dust, scaly old paint, and spray from new. Note difference between application of first coat and black area of unpainted surface.

INTERIOR of 468-foot machine shop building of Pacific Pump, covered, cleaned and repainted over 4th of July holiday. Job in process.

BRIGHT appearance of Pacific Pump's machine shop when completed. Original ceiling a failure, was removed by sweeping, wire brushing, and air blast. Job included cleaning, re-enameling of all machinery, benches and equipment.

shops, have been prone to permit their plants to go indefinitely without consideration of painting.

From the property maintenance point of view, the industrialist faces the ravages of the elements. In the Pacific Coast area, we have the constant changing of temperatures from cold damp nights to the heat of the semi-tropical sun during the day.

This constant change causes the contraction and expansion of metal surfaces, which puts a terrific strain on any paint film. In coastal areas, we often have a brine-bearing fog during the night, and many times until 10 a.m. or later, at which time the hot sun suddenly makes its appearance. As the sudden heat is cast on the surface of the paint film, it immediately sets up a steam, which in time causes a complete breakdown of an ordinary paint film.

Weakest link

A painted surface is only as good as the weakest point thereof, and many times we find that moisture has made its way through small pin holes in the paint, and rust and corrosion has worked under the surface of the paint, completely destroying the bond between the paint and the metal, often actually rusting and pitting the steel.

Rusting and pitting of steel surfaces, and checking, cracking, peeling, and excessive chalking, are some of the more common failures found in the field of industry. The more serious and frequent problems are found in the heavier industries and food processing plants, where the surfaces are exposed to acids, fumes, steam, smoke, etc.

It is advisable to make, or have made, periodic inspections of these surfaces and repaint before the surface has completely failed. Better and more economic results are obtained by cleaning and repainting these surfaces one coat while the original coating is still in good solid condition. This process precludes the need for thorough cleaning, priming, or spot priming, as preparatory work.

Surfaces exposed to drastic conditions should be repainted as often as required to keep the surface in good repair.

ONE BAY of ceiling at Phelps Dodge Los Angeles plant being treated with aluminum paint on black asphalt impregnated roofing. Crane, 24x100 ft. long is staged with 4x6 in. cross members and 2x12 in. planking to support the men and additional staging necessary to reach the work.

GANO F. CULWELL

Interior painting, to preserve light and surface protective advantages, may last from three to ten years, depending on the type of organization and its requirements, Some of our clients, such as Rheem Manufacturing Co., South Gate plant, prefer to repaint their main factory about every three years, while others will go up to ten years, or more. Food processing plants are often obliged to paint much more often.

Exterior maintenance painting is required more frequently in coastal areas than in inland or desert areas; therefore the frequency of repainting is governed by the exposure. We have observed mining machinery in the mountains of Mexico which had not been painted in more than 40 years, and yet it was not badly rusted.

The total paint job may give many years more service if the maintenance department will clean, spot prime, and touch up the finish coat of paint from time to time as weakness shows on the surface. This touch-up may be accomplished by brush or spray gun, whichever process seems more practical.

The owner of a plant may make inspection by observing the physical condition of the surface, looking for rust, scaly paint, or other failures; or if he is accustomed to a light, clean plant, he will not be happy when the ceiling or walls of the working area become dark or smudgy.

If dust, dirt, or lint collect on the surface, this may be removed by cleaning with industrial vacuum or air blast. If the lint or dusty condition prevails, he may install a dust collecting system or air conditioner, which will help to preserve his paint job. At the same time this makes for a healthier, more comfortable environment in which to work.

Equipment required

If an organization keeps a plant maintenance painting crew, and this crew is expected to keep the buildings as well as the equipment in good paint repair, the company should furnish a sufficient supply of equipment, such as drop cloths, rolling stages, aluminum planks, spray equipment, etc. After the equipment has been supplied, then the leadership and personnel must be organized to do the job, if a reasonable degree of efficiency is to be maintained.

Another consideration in this program is the protection of the owner by proper special insurances. The ac-

cident hazard mounts when an ordinary maintenance crew is put inside a plant where they are obliged to work on boards and stages with which they are not acquainted.

Because of the inability to close most plants down for a period long enough for the maintenance crew to complete the work, it is much more satisfactory to have a qualified painting contractor come in and do the job. A well qualified contractor can do the average job of 50,000 to 100,000 sq. ft. in one weekend.

Our organization moved into the Los Angeles plant of Phelps Dodge Corp. on July 20, 1952, and completed almost $290,000 worth of work in 14 days. This work included the walls, ceilings, structural steel, machinery, equipment, and all the code colors on the piping throughout the plant, of which there were several miles of various sized piping, which, along with approximately 25,000 lights of steel sash, had to be brushed.

The industrialist should select his painting contractor with the same care with which he would select a dentist or a physician. He should first require that his contractor be properly equipped to do the job. First, he should be equipped with knowledge and experience in the field of industrial maintenance painting; second, he should be sincere, conscientious, and of impeccable integrity.

What paint is

The three principal components of paint are: (1) pigments, (2) oils or resins, (3) volatile thinners.

Pigments impart color and opacity. Oils or resins bind the powdered pigment into an adherent coating. The volatile thinner adjusts the consistency for brushing or roller coating.

There are many short cuts in the application of paints, and unless an organization operates on a high ethical standard, the job may fail much too quickly to justify the owner's investment. The painting contractor should use material manufactured by a company that will stand behind its product and make good any defect, and the applicator should stand behind his workmanship.

Third, the contractor should have sufficient available equipment to protect the equipment and merchandise and stages to rig the job. Last, but not least, he must have available experienced personnel.

After he has selected his contractor, he should cooperate with him by instructing the heads of the departments to so organize their work that the merchandise may be stored to leave aisles open, the walls clear of materials, so that the contractor's crew may operate through the plant. It is often possible for the purchaser to save money by furnishing air from his own plant or furnishing crane operators to facilitate the operation of the contractor.

After properly protecting the job by large drop cloths, we proceed with the preparation program, which always includes the removal of dirt and other deleterious matter, which may include old paint, rust, scale, webs, etc. In the case of failure of the previous paint job, we are obliged to remove all loose and scaly paint from the surface in order to secure the proper bond between the surface and the primer, either in the case of a two-coat job, which is recommended in painting the underside of corrugated iron roofs, or the finish coat.

Takes off grease

We use a portable steam cleaner with proper solvents or detergents, or both, to remove the grease and dirt from the surface. This operation is followed by a coat of metal primer and finish coat of enamel or one coat of enamel, as the case may be, depending on the condition of the surface. Usually one coat of good industrial enamel results in a very satisfactory job.

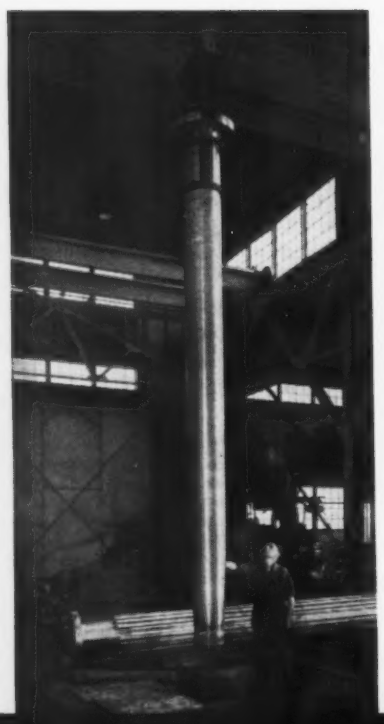
In the case of the Pacific Pump machine shop, which was completed by us in 1950, we used two coats of the same material, fogging the first coat to create a bond and a "tooth" for the finish and cover coat.

As the original paint job on this ceiling was a complete failure, we removed the residue of old paint by sweeping, wire brushing, and air blast. The new job was a three-color combination in which we used an off-white green in the ceiling and truss area, to reflect the light, a light eye-rest green on walls from bottom cord of truss level to a wainscoat, and a dark green wainscoat 42 in. high. We used a dark olive green machinery enamel on all lathes, benches, and other equipment in the plant.

SAME interior as on opposite page, but photographed after completion of painting the plant and machinery. Note even clearness of the light. Among other things, several miles of various sized piping had to be code colored, and some 25,000 lights of steel sash had to be brushed.

SELF-PROPELLED work barges are utilized by Albina to service vessels being worked on

OVERHAUL PROBLEMS



A 25-TON overhead crane lowers a propeller shaft into a vertical gas fired furnace.

ALBINA Engine Machine Works, Portland, Ore., engaged in shipbuilding and ship repairing, as well as manufacturing and repair for industry, must meet tolerances of thousandths of an inch when line boring main engine ship bearings.

The necessity of meeting such close tolerances is responsible for a continual overhauling of the company's portable tools and machines, as well as plant facilities. The company built its own self-propelled work barges, 14x45 ft., to service large vessels. Four of the five barges are equipped with air compressors and welding machines which are run off the propulsion diesel engines.

The fifth is a 200 kw. power barge used for supplying power to the ships when their power plant is down for overhaul and the normal operation and loading must be carried on. One barge also contains one 100 kw. generator, which can be connected, making a 300 kw. combination.

Portable boring machines for line boring main engine ship bearings or portable cylinder boring machines and bars for 10 ft. dia. by 6 ft. long cylinders must also be maintained to extremely close tolerances.

Albina purchased used 3-ton and 25-ton cranes, overhauled them mechanically and electrically, and remodeled the width to suit their building. They also built and installed steel craneways. Installation of a 125 kw. direct current generator and conversion of equipment to direct motor drives has resulted in fewer maintenance problems throughout the equipment.

FLOORS

Here are the answers from 'national proving grounds' located here in the West

"NATIONAL PROVING ground for many types of floors, patching compounds, waxes, cleaners, and systems of maintenance available to industry in the West" indicates the qualifications of the U. S. Naval Supply Center, Oakland, Calif., when it comes to talking about design, installation, and maintenance of industrial floors.

The center has many millions of square feet of warehousing operations, with more than 1,500,000 sq. ft. devoted to merely keeping records on the flow of materials and equipment. It is on these floors that the authority for this article rests.

How to get organized

All too often floor maintenance, one of the most important functions of a building maintenance program, is let slide until deterioration has begun. And usually signs of wear do not show up until costly damage has already been done. Well planned preventive maintenance is the most economical method of assuring maximum service from floors.

The first step in such a program entails analyzing what you have, and checking manufacturer's recommendations. The people who make flooring materials have generally spent considerable time and money testing them.

The second step is to decide at what level you want to maintain your floors. A realistic program can be set up only after studying and evaluating your needs. After the plan has been working awhile, it should be periodically re-evaluated and adjustments made where necessary.

Standardize your procedures as much as possible. Maintain like surfaces in a like manner. This is especially true in the case of wood, linoleum, tile, and the more delicate surfaces. Often an overambitious employee will attempt a faster, or what he thinks is a better method, and use material that will damage the floor. Remember, the actual surface is armor against deterioration.

Make every attempt to prevent surface gouges or cuts, repairing them as soon as possible after they occur. Most floors will stand a lot on the surface, but when various soaps, detergents, and water penetrate the surface, serious damage can result.

What's the first consideration?

At the Naval Supply Center the floor design is made to meet specific conditions. Hence, the surface of the floor or the floor covering varies greatly. Disregarding the design problems involved that determine the actual floor design, let us assume that we have the floor system basically designed and look at the various wearing surfaces and the various types of floors.

There are both asphaltic concrete and concrete slab floors in the floating type of floor, which rest directly on the ground and are subject to its subsidence. These are warehouse storage floors. As such, the floor surface is firm and smooth for efficient fork lift operation.

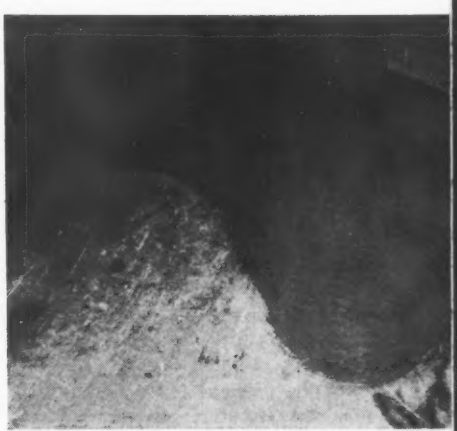
In a structural building at the Center, there are wood floors for both the main and mezzanine floors, with and without a floor covering, and concrete floors, uncovered for storage areas and covered for office, administrative, and recreational areas. There is also one major administration and office building with a terrazzo surface over the concrete.

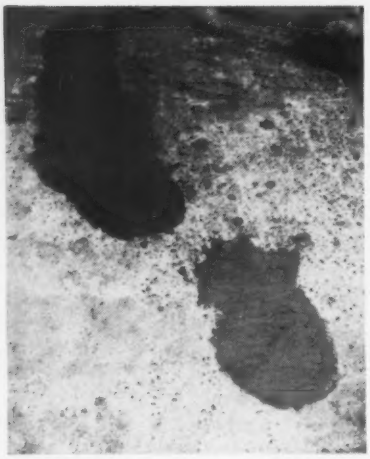
Use of various grades of linoleum as a floor covering was very common at the time the Center was being constructed. However, since then asphalt tile, rubber tile, and other surfacings have been developed and improved, and are now regular floor covering

CARELESS dragging of a sharp cornered piece of office equipment caused this long cut in an asphalt tile floor. All furniture resting on this type of floor should sit on broad based legs or casters.

AFTER YEARS of wear, the Naval Center's concrete piers became so badly cracked and fractured that they impaired efficiency of operation. An asphaltic mastic surface now gives excellent service.

IT IS IMPORTANT to give an asphaltic mastic patch smooth lines and feathered edges to protect it from wear at the edges. Attention to edges, removal of roughness, and proper sealing insure maximum patch life.





ASPHALTIC mastic patch in the lower right freshly applied to broken concrete with trowel. Patch in upper left hand corner has been finished and buffed uniformly to conform to surrounding area, then sealed.

in all alteration and new construction work.

Use of asphalt tile has increased over linoleum, due primarily to the fact that it provides an equally satisfactory surface at less cost. The final selection of a particular floor covering is based on Center experience, use of area, and the manufacturer's recommendation. In certain special areas the color scheme, general treatment, and appearance is given major consideration in the final selection of the floor covering selected or specified.

What are the characteristics of these various floors?

Longevity of structural floors is dependent upon proper design and construction. Floors should be designed to accommodate definite floor loadings and to perform definite functions, such as resistance to water. oil, chemicals, heavy vehicle and foot traffic, etc.

The floors in most of the warehouses and multi-story buildings at the Naval Supply Center are constructed of reinforced concrete, with permissible floor loadings of from 200 to 600 lb. per sq. ft. These floors consist of several types such as flat slab, that is, the load is supported by the strength integrated in the slab itself without the use of beams and girders, slabs placed over structural steel beams and girders, floating slabs placed directly on the ground, and slabs poured integral with reinforced concrete beams and girders.

In the office sections of buildings, concrete floors are generally covered with asphalt tile, linoleum, or asphaltic mastic. The warehouse sections are surfaced with a rich mortar usually ¾ in. to 1½ in. thick, which helps to resist shock and wear caused by heavy fork-lift and tractor traffic, and to make the floors water resistant. Scuppers have been placed at the exterior walls to drain the floor surfaces. Color may be mixed integral with the mortar, but it is not desirable to add color pigment in excess of 5% by weight of the cement, as it reduces the strength of the concrete.

Subsidence of concrete floors is a problem at the Naval Supply Center where the floors are not supported on piles. The floors in some buildings have gone down several inches, leaving the floor surfaces uneven and making it difficult to operate fork lifts and to store materials. This condition has been corrected by applying an asphaltic mastic floor over the concrete sub-floor. Sand is usually mixed with asphalt to give a better wearing surface. Asphaltic mastic is placed at a maximum of ⅝ in. thick, with a coarser mixture as a leveling course.

Asphalt floors exist in several warehouses. The asphalt is usually 2 in. thick, placed over compacted red rock fill. This is the case where the buildings are more or less of a temporary construction. Floors of this type have good wearing surfaces and are easily repaired, which makes them particularly adapted for this type of building.

Terrazzo has been utilized for floors in foyers of some buildings, and in a minor way for lavatory floors. It consists of irregular marble or granite chips imbedded in cement mortar and ground to a smooth finish. This makes for a hard, tight, waterproof surface and is very attractive, but the cost prohibits its use except in special cases.

Wood floors have received coverings of asphalt tile or linoleum to allow for ease of cleaning. The majority of the buildings with wood floors are of the barracks type. The necessity for constant swabbing requires that these floors be made as water resistant as possible. The use of an excessive amount of water on wood floors causes them to warp and buckle, and seepage of water through the floors causes floor joists to rot to the point that they have to be replaced.

It is therefore economically desirable to apply special floor coverings to wood floors. They are placed over

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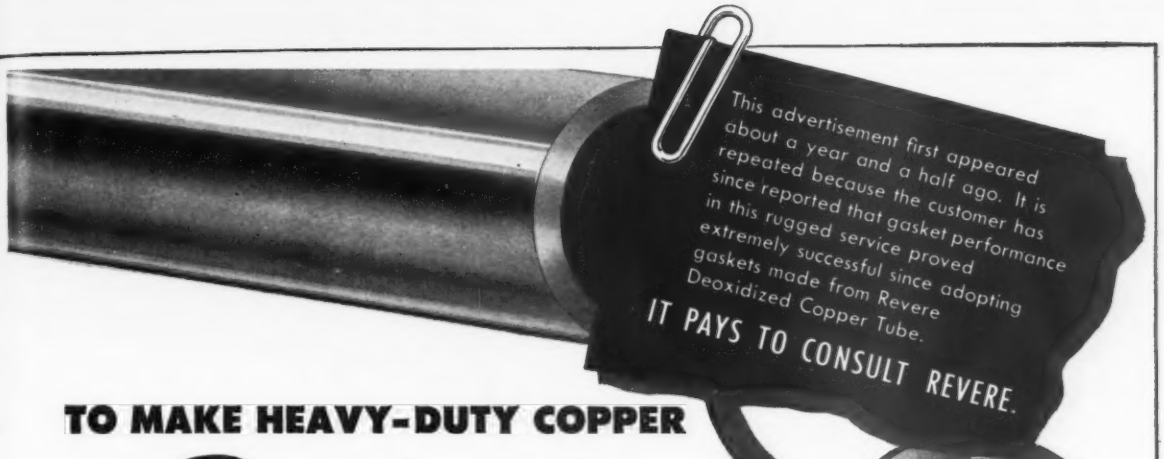

This advertisement first appeared about a year and a half ago. It is repeated because the customer has since reported that gasket performance in this rugged service proved extremely successful since adopting gaskets made from Revere Deoxidized Copper Tube.

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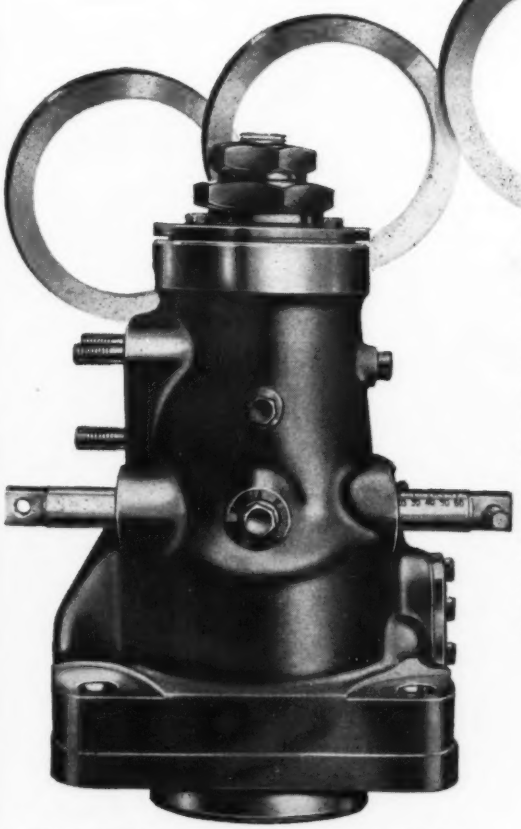

Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful.... This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

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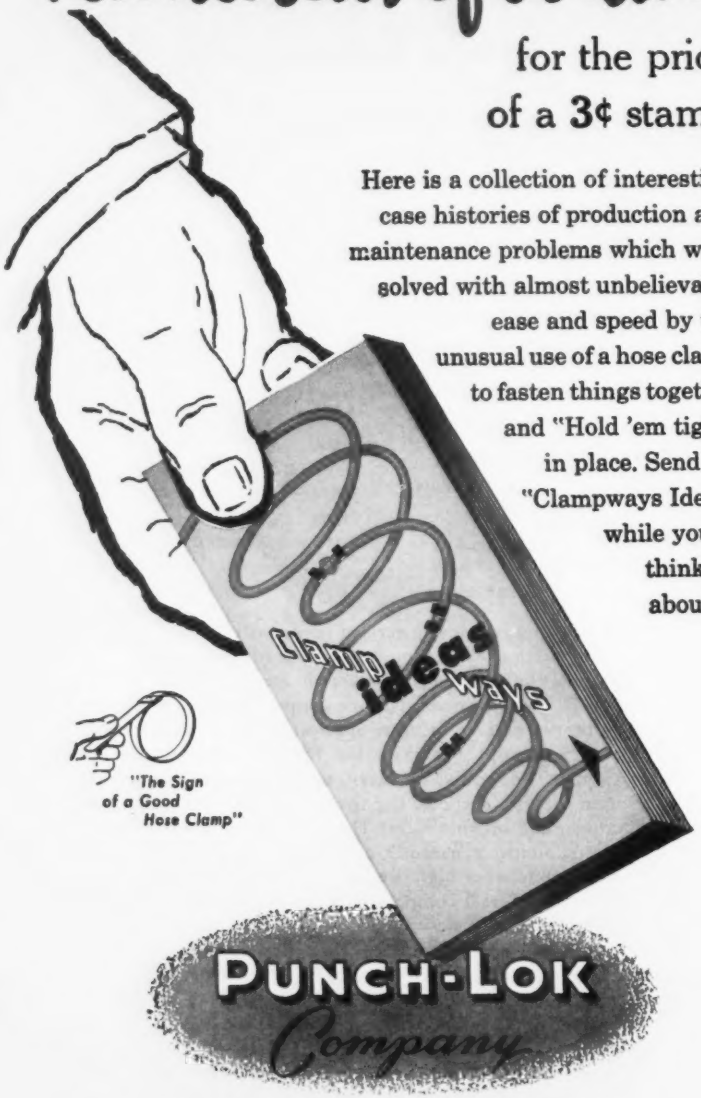
Here is a collection of interesting case histories of production and maintenance problems which were solved with almost unbelievable ease and speed by the unusual use of a hose clamp to fasten things together and "Hold 'em tight" in place. Send for "Clampways Ideas" while you're thinking about it.*



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PUNCH-LOK • BOOTH No. 350

a plywood base, securely nailed to the existing wood floor to make a smooth surface and to cover any unevenness in the floor. The floor coverings are cemented to the plywood with waterproof cement, after which they receive several coats of wax buffed to a hard finish.

The Supply Center has broken down its floors into various categories and these will be treated individually with respect to maintenance.

What determines floor life?

The life of any floor covering depends primarily on the structure and surface to which it is attached, and secondly on the way it is maintained. Material secured to a rough uneven surface will soon be cut or punctured by the impact of loads imposed upon it—walking or wheel loads. Also excessive deflection of the supporting structure breaks the bond between the adhesive and the floor covering.

In office areas, dormitories, etc., linoleum (heavy duty ⅛ in. and 3/16 in. thick) has been widely used at the Naval Supply Center. This material where properly installed or maintained has given good service. Some installations 10 years old are still serving well. Linoleum is not recommended for floors without proper ventilation between underfloor and ground.

Another roll material used, similar to linoleum, but different in composition, is asphalt saturated felt floor covering. This material is less expensive but has proven to withstand severe wear and abuse with less underfloor preparation.

Due to the initial cost, ease of installation and repair, asphalt tile has taken the place of linoleum in recent years. This material has worked well on concrete in contact with the ground, provided the subfloor is not subjected to hydrostatic pressure.

Asphalt tile can be repaired by heating the damaged tile with a blow-torch, removing it, and putting new tile in place. Small holes have been repaired by heating a piece of asphalt tile with a soldering iron and letting the softened material flow into the hole.

Cork tile was installed in the bedrooms of the bachelor officers' quarters to reduce noise at the source, since expensive acoustical treatment of the floors was not possible. This installation has given a quiet and comfortable well wearing floor. In areas having special requirements

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*Towveyor is a registered trademark identifying floor level conveyors powered, manufactured and controlled by the Jervis B. Webb Company.

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Why continue to waste time and money with costly old-fashioned material handling methods? Get the facts on Webb engineered conveyor systems for every purpose. Write or phone today for complete information on Webb conveyors and engineering service.

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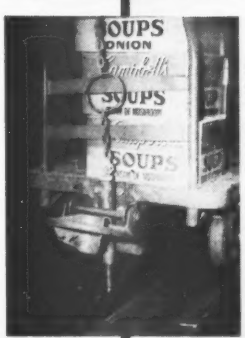
Heavy duty design makes it possible for a fully loaded cart and trailer to operate from one towing pin.



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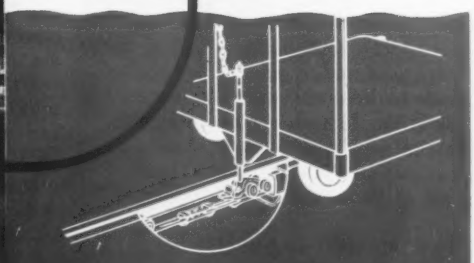
Webb Towveyor is a continuous underfloor chain engineered so that carts may be quickly attached or released at any point by means of simple towing pin.



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SMALL CASTERS and chair and desk legs with only a small surface area to spread out the office equipment's weight leave this sort of bruise and depression. Broad-based legs and caster should be used on asphalt tile.

vinyl asbestos, solid vinyl, vinyl cork, rubber, and grease-proof asphalt tiles have been used.

In installing the materials included in this section, it may be generally stated that linoleum and non-ceramic tiles should not be applied directly to a wood subfloor; instead, a lining felt should first be applied. On concrete above the ground, they may be cemented directly to the concrete. Depending on their degree of hardness, all resilient tile is subject to indentation due to sustained loads of furniture. As a safeguard, furniture rests should be used that are flat bottom and tend to spread out the load.

This type floor is maintained by sweeping daily with a soft hair broom. Periodically, the floor is wet mopped, using very mild detergents and a wrung out mop. As desired, the floor is waxed with water emulsion polish and buffed. Buffing not only produces a glossy finish, but tends to keep the wax film in good condition. Materials containing oils, naptha, gasoline, or organic solvents are not used on tile floors as they tend to deteriorate the composition.

How should asphalt tile be looked after?

Asphalt tile floors have become increasingly popular in the last few years for use in offices where they do not receive unusual wear. Being an asphalt product, they form a springy surface which is not unusually tiring to those who have to walk on it. Large machines, filing cases, and other equipment will, however, leave their impression in this type of floor.

After considerable experimentation, the Naval Supply Center has found the single most important part of the maintenance program is to retain the surface and luster of the asphalt tile as it comes from the factory. In this respect, a minimum amount of scrubbing, buffing, and cleaning with mild cleaners is to be desired.

A water emulsion wax rather than a paste wax is mopped on after sweeping. If a sheen is desired, the floor can be buffed, although this is not necessary except for appearance. Various water solution preservatives are also available for protecting the factory finish.

A mild cleaner should be used periodically to remove the build-up of wax, but great care should be taken so as not to remove the tile luster as well. Best wear characteristics seem to come from tiles that are fitted tightly together but not forced into place.

Care should be taken to protect tile from heating and cooling of radiators, as this can cause the tile to dry out and crack. Also to be avoided is constant wetting, for moisture will infiltrate into the cracks between tiles and loosen the adhesive, causing buckling, wrinkling, and broken tile.

One of the foremost advantages of this type of floor covering is the ease with which damaged areas can be replaced. A blow torch is used to heat up the damaged tile which can then be easily removed. This space should be cleaned out, new adhesive applied, and a new tile slipped into place. It has been found advisable to place sufficient weight on the new tile to assure adherence.

Wood floors

Floors of pine or other soft woods present a resilient surface whose characteristics of wear make it suitable, and in some cases necessary, for specialized operations. It is of primary importance in maintaining wood floors to maintain a perfectly smooth surface, as any irregularities make for rapid wear and hazardous travel. Wood floors should be kept smooth by sanding and filling irregularities and cracks before the areas become pitted or splintered. They should then be sealed by painting, oiling, or waxing.

Choice of seals necessarily depends upon types of surfaces desired, expected traffic, and desired appearance. Really ambitious waxing can present a safety hazard if the floor is too slippery, or wax may build up to unnecesesary thickness or gumminess, necessitating frequent removal. Wood floors should be checked regularly for dry rot, termites, other insects, and water seepage liable to speed rotting. A heavy paste wax may be used regularly, or a water emulsion wax may be applied more frequently.

Wood floors are dry-swept daily with a soft hair broom. When considerable quantities of dust and dirt are present, a sweeping compound is used. Periodically, the floor is buffed with a floor polishing machine, using steel wool pads. As required, solution of non-skid polish and water is applied and the floor is buffed with heavy brushes.

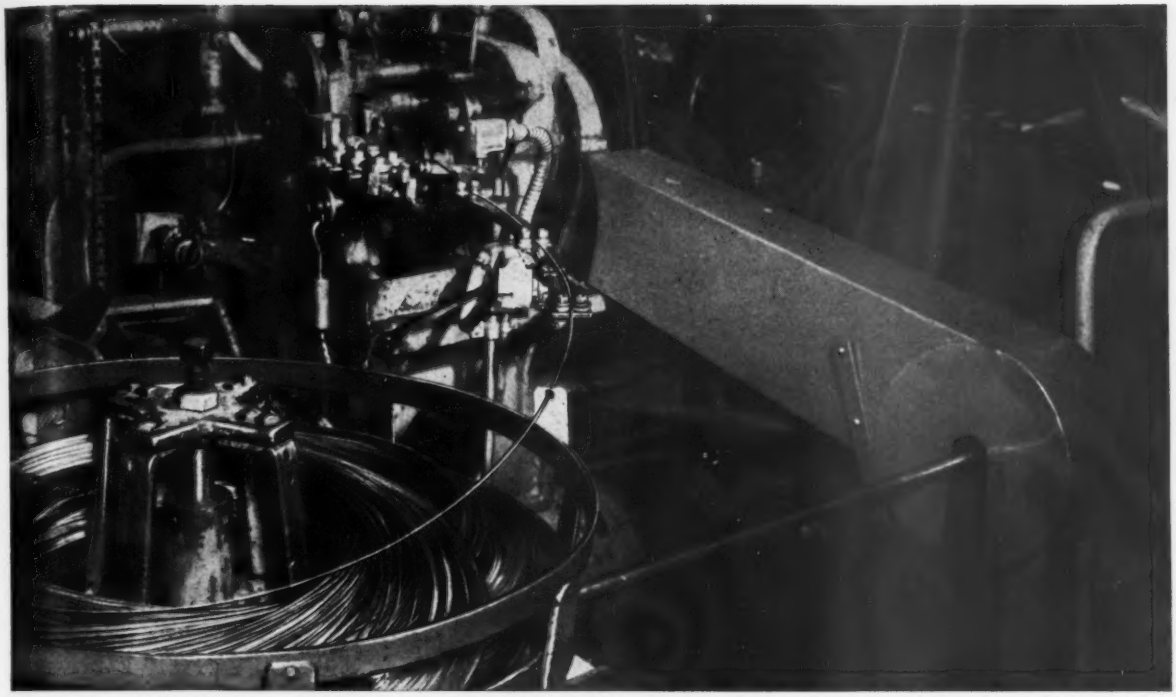
Use water sparingly

Always on wood floors, water is used very sparingly as it tends to deteriorate the sealer and wood fibre. Likewise, strong soaps, sweeping compounds containing sand or grit, oils, etc., are not used as they attack the finish of the floor.

Sweeping and swabbing wood floors should be done regularly, while waxing and buffing can be less frequent. Regular inspection should be made of corners and supporting joists. These ladders should be checked for rot, while all woodwork should be checked for cracks and checks.

Patching is usually accomplished by ripping up the faulty sections and replacing these with new boards. Special care should be taken to install these boards over joists so that they are well supported, and then the new surface should be sanded smooth, filled, and sealed to become flush with the surrounding surface.

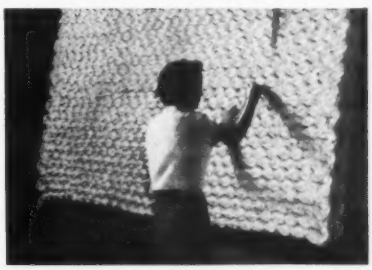
Investigation of the areas of greatest wear may indicate the desirability of flooring with hardwood, which re-



Forming barrel coil springs, this machine uses more than ½ mile of Premier Spring Wire for each Beautyrest Mattress. The Simmons Company, San Francisco, has used wire from Columbia-Geneva in every Beautyrest made . . . for over 28 years!

1/2 mile of Premier Spring Wire goes into every Beautyrest

Testing of wire goes on constantly at Simmons. These 15-gauge barrel coils must carry a load of 2½ lbs. when compressed to 5 inches. U·S·S Manufacturers Wire comes in more than 400 different types, grades, and finishes. And Columbia-Geneva also can produce tailor-made wire to meet your own specifications.



"Racking" operation on a Beautyrest Mattress binds cloth-covered coil springs together. These coils are just one of the many uses for U·S·S Manufacturers Wire. Columbia-Geneva, with the greatest wire-making facilities in the West, also produces wire for everything from can keys to coat hangers.

More than 33 million feet of Premier Spring Wire is used every year by the Western operation of the Simmons Co. All of this uniform, high-quality wire comes from the mills of Columbia-Geneva, Western producing member of the industrial family that serves the nation, United States Steel.

For any type of wire you need, rely on U·S·S Manufacturers Wire. It's production is rigidly controlled by United States Steel from raw ore to finished product. Columbia-Geneva specialists are always available to help you select the wire that's right for your job. Contact your local distributor or write to Columbia-Geneva Steel, 1403 Russ Building, San Francisco 6.

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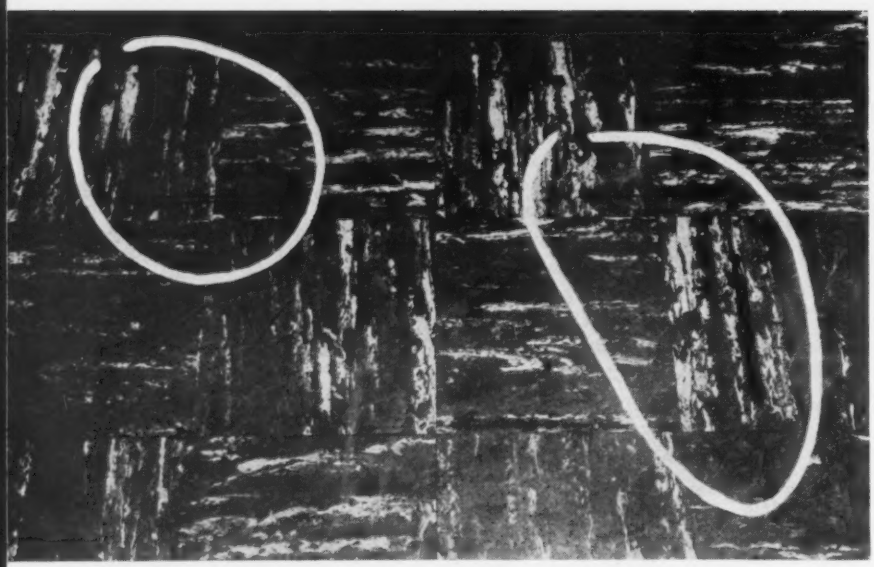

HEAVY filing cabinets and other sharp-edged office equipment will slowly cut through resilient asphalt tile flooring, leaving permanent cuts and dents. Through these wounds often comes further floor damage.

quires virtually the same sort of maintenance and repair as softwood floors. Hardwood, however, because of its great durability and handsome appearance, often has more attractive finishes and may warrant special care.

How should fractured concrete be repaired?

Concrete usually provides a floor finish which requires a minimum of maintenance. In warehouses, care must be taken to repair cracks, spalls, and surface breaks as soon as possible. There are a number of prepared materials available for this work. Shallow patches made with portland cement concrete are not, as a rule, satisfactory.

Close attention should be given to expansion joints; often, indication of developing trouble can be detected here early. Concrete floor finishes are dry-swept daily, using a sweeping compound when the floor is dusty. Paint is used on this type floor for functional requirements only, i.e. marking safety lanes, etc.

Which seals and treatments work best on concrete?

a. Fluosilicate treatment — used when the floor is subjected to considerable traffic, heavy trucking, oils, etc. This treatment is accomplished by applying a mixture of pine, fluosilicate, magnesium fluosilicate, and water, and allowing a three or four hour period of absorption between applications.

b. Sodium silicate treatment (water glass)—used when the concrete finish is chalky. Sodium silicate is usually thinned with water and applied in three coats, allowing each coat to dry thoroughly.

c. Varnish seal treatment—used to prevent dusting of concrete floors that are subjected to heavy foot traffic. It is applied liberally by brushing into the pores of the concrete, allowing to dry, and then buffing. This treatment affords an excellent seal for subsequent waxing of floors.

d. Waxing—used in areas where there is an excess of foot traffic. This treatment will greatly improve appearance and increase wearing qualities of the floor. It is accomplished by first sealing the floor, applying a film of wax evenly, then buffing. In most cases two coats of wax are applied. Although concrete floors may be washed with detergents, soaps, etc., they are always rinsed with clear water to avoid injury to the treated surface.

Unpainted floors can stand stronger detergents and soaps, but otherwise their cleaning consists of sweeping, swabbing, and buffing. The Naval Supply Center has tried out sweeping machines and mopping machines, but has found these machines are not worth while in congested areas, and it is generally not worth while to move materials and equipment to admit the machines. Most buildings at the Center are regularly swept by employees working in the building, and are intermittently but regularly washed, buffed, and inspected.

Dusting has not been much of a problem at the Center. Dusting usually occurs where continual pressure and abrasion first pit the concrete and then slowly break down the areas between pits to give a rough surface continually covered by a layer of pulverized concrete dust. Practically all vehicles are mounted on either hard rubber or pneumatic tires, and concrete areas of unusual wear are examined before this condition can develop.

Concrete floors must be checked frequently for cracks, and these should be attended to before surrounding areas begin to crumble and a hazard develops. Cracks in deep concrete should be cleaned out to present the best possible surface area for the repairing material. The old concrete should be washed free of dust and sand, and then brushed with a solution of cement to act as an adhesive. The crack may then be filled with fresh concrete to the same consistency as the original floor.

Smaller cracks or surface cracks are usually repaired with asphaltic mastic or similar patching materials. Proper attention should be given to letting patches thoroughly dry and finishing them off so that there are no bridges or depressions to catch and wear.

What to use on special problem areas

Plastic magnesium oxychloride cement may be laid over old or new floors and sub-bases of wood, concrete, and steel. The material consists of magnesium oxide, magnesium chloride aggregate, color filler. These are combined to a mortar which is spread on the job, leveled, and finished by troweling or grinding. The usual thickness of the layer is about $\frac{5}{8}$ in. thick.

The resulting floor is resilient, dustproof, relatively non-slip, noncombustible, inhibiting to bacteria and fungus, and having good wearing qualities. This flooring material is used in food preparation and galley areas when the use of more expensive material is not justified. The floor may be attacked by sulphuric acid, but not by ordinary chemicals in the concentration which would usually be encountered. Alcohol, grease, naphtha, and other common solvents do not attack this flooring. Though these floors are not water-

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We also find this unit extremely useful in straightening up and rearranging our Storage Department. It will get in between and behind objects where there is very little room, and one man can move material that here-tofore required several men. The reverse motion of the unit is invaluable in pulling heavy crates and boxes out of tight spots and corners.

Simplicity of operation enables any man in our warehouse to use the Tug-Bar, whereas most mechanized equipment requires a great deal of instruction and experience, and in some instances, a special operator.

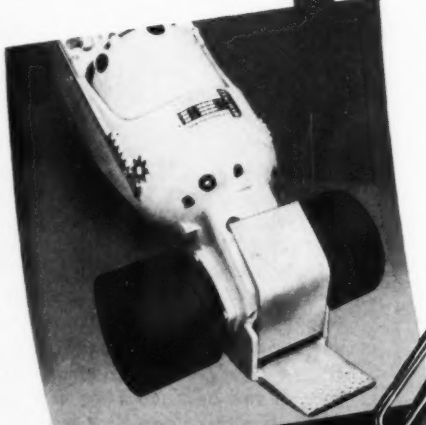
The Tug-Bar has found great favor with both our management and operating personnel. It is considered a vital piece of equipment in our operations, and, as needed, we expect to purchase more of them.

Sincerely yours,

WESTHEIMER TRANSFER & STORAGE COMPANY

F. A. Dobbins

F. A. Dobbins
Warehouse Superintendent



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proof, intermittent wetting and drying is not harmful.

In certain areas a non-slip floor is desirable and this is accomplished by mixing non-slip aggregates with the concrete. This type surface is maintained by scrubbing with a stiff brush, using a mild soap and water.

Mastic floors are maintained by applying water emulsion wax and buffing with stiff brushes. By providing this wearing film of wax, mastic floors may be made to endure indefinitely.

Asphalt concrete

This type floor is most often used in warehouses. Maintenance, as a rule, consists only of patching cracks or gouges. Patching material is usually asphaltic concrete; however, there are many mastic materials available that are quite satisfactory.

If this type floor is used where a better appearance is desired, it should be sealed with a good asphalt sealing compound and maintained in the same manner as asphalt tile. Where asphaltic concrete is used in storehouses that handle oils, solvents, fuel oils, etc., the floor should be sealed. Petroleum products readily attack all asphalt flooring materials unless special precautions are taken to protect them.

Terrazzo floors are maintained by washing with a mild soap and water until a sheen is produced. Afterwards, the floor is waxed with water emulsion polish and buffed with stiff brushes.

Ceramic tile

This material has been used principally in toilet rooms, shower stalls, and galleys. When properly installed over a firm substructure, these floors are sanitary and impervious to moisture.

In food preparation and serving areas it is desirable that quarry tile be used with mortar joints filled with synthetic resin joint filler. The food acids will not attack the quarry tile or joint filler, while ordinary cement grout will soon deteriorate.

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VACUUM CLEANING in industry

"VACUUM CLEANING EQUIPMENT can be used to advantage wherever fugitive dust is present. Uncontrolled dust in the plant produces a series of hazards of increasing degree, many of which can assume serious proportions," said R. L. Stephenson, U. S. Hoffman Machinery Corp., at the Seventh Annual Conference of the Association of Food Industry Sanitarians in Berkeley, Calif.

The most common hazard is that of dust and dirt permitted to accumulate in out-of-the-way and hard-to-reach places. If this dust or dirt is of organic origin, it makes ideal breeding grounds for all types of infestation which can readily spread to other parts of the plant, contaminating raw material and finished product alike.

This is especially true with accumulations on overhead surfaces and structures, which usually are difficult to clean using conventional methods, and thus build up a dangerous deposit of light and fluffy air-floated dust which frequently is well weighted with infestation.

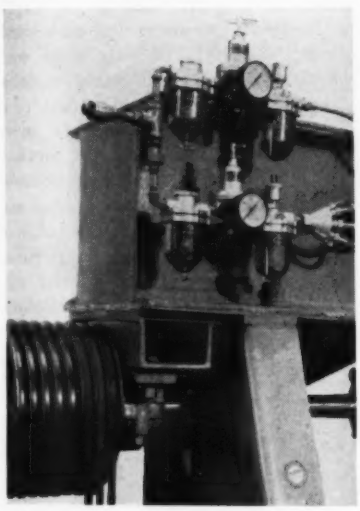
Vacuum cleaning equipment is divided into two general classifications: portable units and stationary systems.

Standard practice with industrial vacuum cleaning equipment is to use

1½-in. dia. vacuum cleaning hose and tools for general cleaning and 2-in. dia. for handling heavy spills. This hose is in 25-ft. lengths and ordinarily no more than two lengths are joined together.

Industrial portable vacuum cleaning units are available for handling heavy or light, inert or explosive dust in small or large quantity. In short, they can be used effectively on any material compatible with pneumatic conveying.

MICRO-FOG LUBING gains acceptance



LUBRICATOR on lumber turning machine at Seattle plant of Portland Iron Works.

OIL FOG LUBRICATION for bearings, gears, chain drives, etc., has been gaining acceptance in recent years in many plants in preference to sump splash lubrication.

A choice of various makes and types is available, and advantages of this method include the following, according to D. G. Faust, chief engineer of C. A. Norgren Co., Englewood, Colo.:

Maintenance of oil seals on gearing heads is no longer a problem.

Contamination of lubricating oils by coolants on some machine tools has been overcome.

In some critical applications, frequent oil changes are not necessary, nor is an oil reservoir required.

Where dust and dirt or corrosive fumes are likely to get into bearings, gear boxes, etc., as in plating rooms, a positive pressure is maintained within the gear housing so the corrosive fumes do not enter the gear case.

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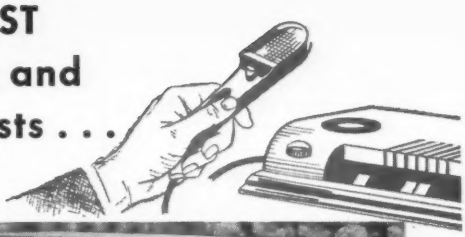

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Vic Fawcett

But first, let's take a look at the Kookaburra. Our recent visitor, Phil Kirkwood from Melbourne, told us that the Kookaburra is sometimes called "the laughing jackass"—and at any given moment, this bird can go into convulsive peals of loud laughter. (TV comedians please note.)

This column is really not intended to be a study in Australian nature, but Mr. Kirkwood told us of the most amazing of all animals, the Platypus, which has a soft bill like that of a duck and fur like a beaver's. It is a mammal but lays eggs like a bird.

Ned Brown of Brown Drilling Company undoubtedly can elaborate on this and other wonders of the continent "down under." Ned drilled the discovery well for the Standard Oil of California-Texaco partnership, which is located about one and one-half miles from the Coast of Western Australia near the town of Learmonth.

For those who may be vacation-minded Pan Am flies it regularly in thirty-six hours, according to our visitor.

Vic Fawcett

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SEVEN STEPS to BETTER LIGHTING

ALTHOUGH it is difficult to prove that dirty lamps and fixtures result in an increase in the cost of finished product, there is little doubt that a properly cared-for lighting installation will have a beneficial effect on production efficiency of the plant when compared with a similar lighting installation which has been neglected.

This article has been written from the remarks of Bert Osterman of T. L. Rosenberg Co., Oakland, Calif., speaking before the Illuminating Engineering Society in San Francisco.

Adequate maintenance, as opposed to neglect, can be expected to show six potential advantages:

1. Reduction of accidents (25% of industrial accidents).
2. Improved quality of work.
3. Fewer rejects.
4. Increased production.
5. Improved inspection.
6. Improved employee morale.

Two major factors of waste occur when lighting installation is neglected. One of these involves the capital investment in the installation, the other the spending of money for wasted electric current. In industries having large numbers of fluorescent lighting units, these hidden losses can mount up swiftly.

To get your dollar's worth

There are seven easy steps to reduce costs and give you more light for your lighting dollar:

1. Make periodic light meter checkups. Light output of your installation will gradually decrease if nothing is done to offset the effects of dust accumulation, lamp burn-outs, lamp depreciation, voltage drop, or light absorption by dark or dusty room surfaces. Lamp voltages are readily noticed, but other factors which cause a slow steady decline in light production are often overlooked. Periodic measurements with a light meter should be made to determine when cleaning, painting, and lamp replacements are required.

2. Adopt a simplified lamp replacement plan. Two good reasons for this, applicable in most plants, are: (a) The cost of replacing lamps is high; (b) All lamps depreciate slowly with use, and a period is reached when fluorescent lamps must be replaced if lighting levels are to be maintained. Schedules should be arranged so that lamp replacement and cleaning periods will coincide.

3. Establish a periodic cleaning schedule. Dirt and dust can reduce light output of your system by 50% in a comparatively short time. The amount of time between cleanings is determined by the rate of dust accumulation. In some locations, cleaning every few months may be desirable, while others get along well on a semi-annual cleaning. Be sure your men are well trained in lighting installation, cleaning, and maintenance; or if this is not feasible, it may be more economical to call for the services of a lighting maintenance contractor.

4. Clean or repaint room and machine surfaces regularly. The color of walls, ceiling, floor, and machines has considerable effect on the efficiency of any lighting installation. Dark and dirty walls and ceilings can absorb as much as 90% of the light.

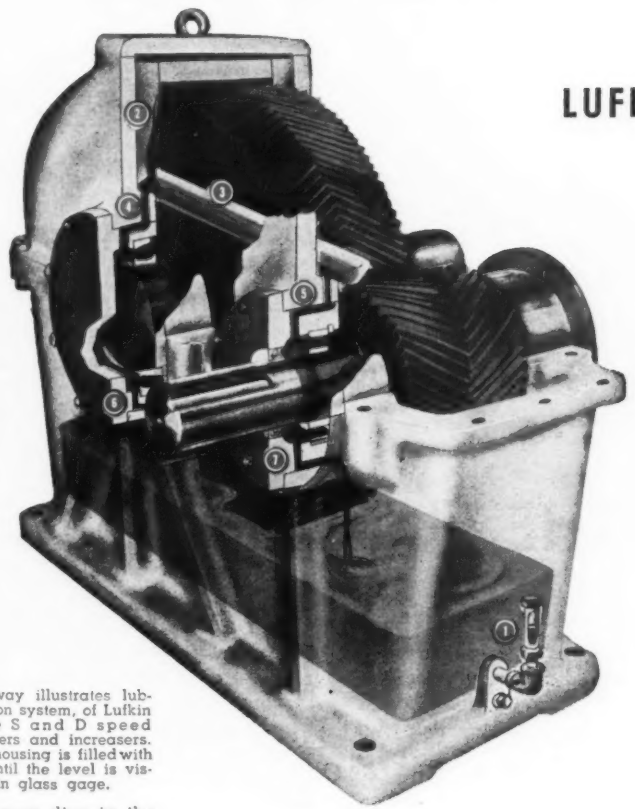
5. Keep a stock of parts available. Production may be impaired by the failure of any part of your lighting system. Every plant should have on hand an adequate stock of replacement parts.

6. Make use of labor saving maintenance devices. A number of devices have been designed to simplify lighting maintenance and it will pay to use those suited to your particular operations. They should provide for the safety of operators, be easily maneuverable, and enable overhead maintenance without interfering with machine operations.

7. Maintain proper voltage. Both incandescent and fluorescent lamps are designed to give a rated output at a determined voltage. Therefore, to get the most light and life out of lamps and auxiliary equipment, check your voltage regularly to see that it stays within the specified limits tolerable in your equipment.

The many benefits of a good lighting installation greatly outweigh its costs. While adequate lighting maintenance is amply justified from an economic point of view, the maintenance program should also be based on the knowledge that good lighting plays a very important part in the safety, morale, and productivity of personnel.

gears with Guts



Cutaway illustrates lubrication system, of Lufkin Type S and D speed reducers and increasers. The housing is filled with oil until the level is visible in glass gage.

The gear dips in the bath of oil, lubricating the gear teeth. The film of oil which adheres to the side of the gear rim is deflected by wiper **2** into oil trough **3** which is cast integral with the cover. Oil flows by gravity from the trough through oil passages **4** and **5** into all bearings and returns to the sump by oil-return passages **6** and **7**.

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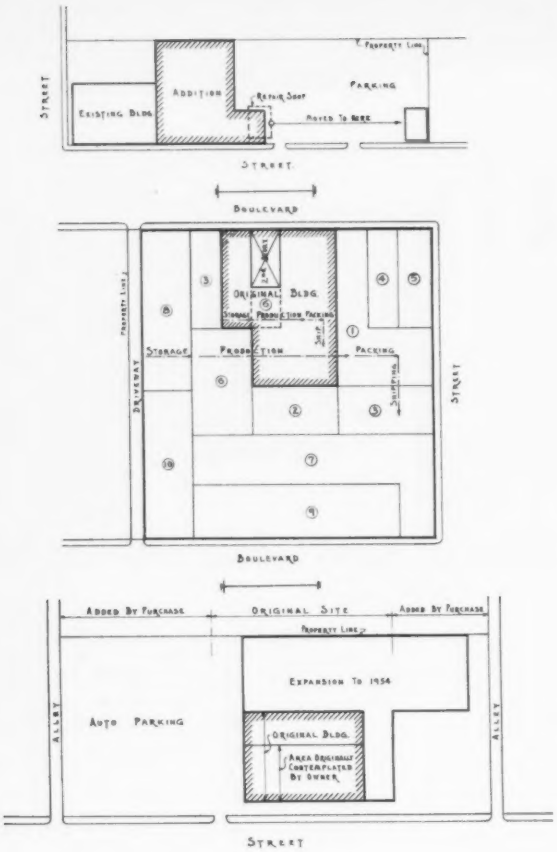


TOP SKETCH: Costly lack of fore:hought. Right while expansion layout was being developed, the owner hurriedly built on the site a steel frame truck repair shop which later had to be moved as indicated. Existing building was then remodeled and enlarged from 16,000 sq. ft. to 40,000. Production flow revised to conform to new layout.

CENTER: For a second expansion, only an extension of the plant was involved. Area enclosed by cross-hatching shows original new plant, 45,000 sq. ft. including second story expansion of principal production operation. Additions made in order indicated by number. Completed area 300,000 sq. ft. shows production flow unchanged.

LOWER: Faster growth than expected. Area enclosed by cross-hatching shows first new plant of 28,500 sq. ft. where detailed layout studies demonstrated need of the larger area. Later adjoining property as shown was purchased, and expansion to date brings total area up to 19,000 sq. ft.

You are bound to grow bigger, so to prevent it snarling up your production flow . . .

DESIGN FOR THE FUTURE NOW

SEVERAL interesting reports and discussions on plant construction and layout were featured by the second Institute on Industrial Plant Design held in Los Angeles last March. The first institute last year, largely devoted to physical aspects of plant design, was featured extensively in the May 1953 issue of WESTERN INDUSTRY, but this year's program was so largely centered on questions of paperwork, codes, etc., that the major portion of it was unsuitable for reproduction in the magazine.

Properly programming the requirements for a new building in order to anticipate the future needs of the particular business was stressed by Kenneth C. Grant, civil and structural engineer, of the firm of Grant & Bruner, Ltd., engineers-architects, Los Angeles.

This demands close study of the economical handling and routing of materials during the manufacturing process, he said. Spaces provided for the various operations must be the right size and clearances and must be strategically located with reference to each other. He strongly warned against cramping of departmental spaces to fit today's requirements closely, because no matter how well arranged, any layout into which the operation exactly fits is too small to start with.

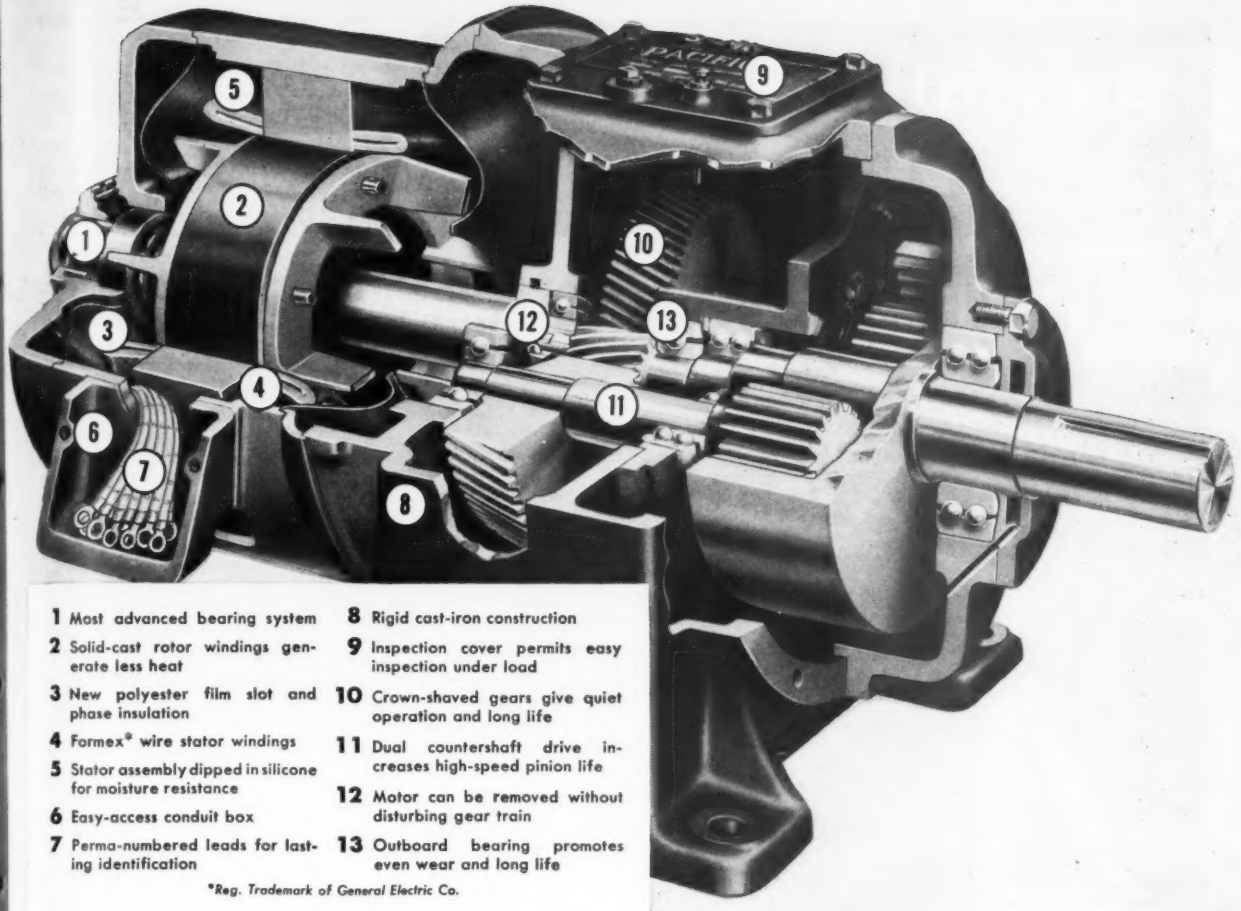
To avoid layout details

A surprising number of inconvenient, irritating details of layout can be avoided, according to Mr. Grant, by studying plants making the same or similar products and by asking department heads what they would change if they were laying the plant out again.

He recommended a tentative outline of the plant layout which will determine the minimum size of site required and indicate general column spacing, headrooms, etc. Inadequate allowance for clearance requirements could cause trouble later, while unjustified over-generous allowance will cause needless construction cost.

Any tendency in the preliminary estimate of the building cost to use over-generous unit costs or to include an excessive allowance for miscellaneous items and contingencies, may lead to cutting down the size of a plant from its proper size or to cheapening the type of construction. Examples of this prove that desired plants could have been built within the budget after all.

With smaller plants where the site required is relatively small, it is important to study the possible need of suitable exposures and separation spaces, especially if large spaces in single rooms are needed. Area limi-



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2 Solid-cast rotor windings generate less heat
3 New polyester film slot and phase insulation
4 Formex* wire stator windings
5 Stator assembly dipped in silicone for moisture resistance
6 Easy-access conduit box
7 Perma-numbered leads for lasting identification
8 Rigid cast-iron construction
9 Inspection cover permits easy inspection under load
10 Crown-shaved gears give quiet operation and long life
11 Dual countershaft drive increases high-speed pinion life
12 Motor can be removed without disturbing gear train
13 Outboard bearing promotes even wear and long life

*Reg. Trademark of General Electric Co.

Cutaway view, double-reduction unit. G-E Pacific Gear-motors available in standard ratings 1 to 50 hp, 780 to 13.5 rpm output speed.

Now G-E Pacific Gear-motors are built with the all-new TRI 55 CLAD motor

REG. U.S. PAT. OFF.

The new Tri-Clad '55' motor—leader in modern motor design—is now an integral part of most G-E Pacific Gear-motors 1 to 5 hp. Gear-motors 7½ to 30 hp will be equipped with the new Tri-Clad '55' as higher ratings become available.

Packing more horsepower per pound and higher full-load speeds in a smaller frame size, this completely new motor makes the G-E Pacific Gear-motor an even more compact, more efficient low-speed drive. Newer, stronger insulation in the Tri-Clad '55' will add years of gear-motor life on the toughest applications. Its more fully enclosed construction makes this dripproof gear-motor suitable for many applications where dripproof enclosures formerly could not be applied.

Take advantage of the very latest advancements in motor design, materials, and manufacture. Specify G-E Pacific Gear-motors built with the new Tri-Clad '55' motor. They're the logical answer to most low-speed drive problems.

For more information about new G-E Pacific Gear-motors contact your nearest Western G-E Apparatus Sales Office, or your Authorized G-E Motor Agent. For descriptive information write to General Electric Co., Section 648-16, Schenectady, N. Y. for your free copy of bulletin GEA-6076.

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

GENERAL ELECTRIC

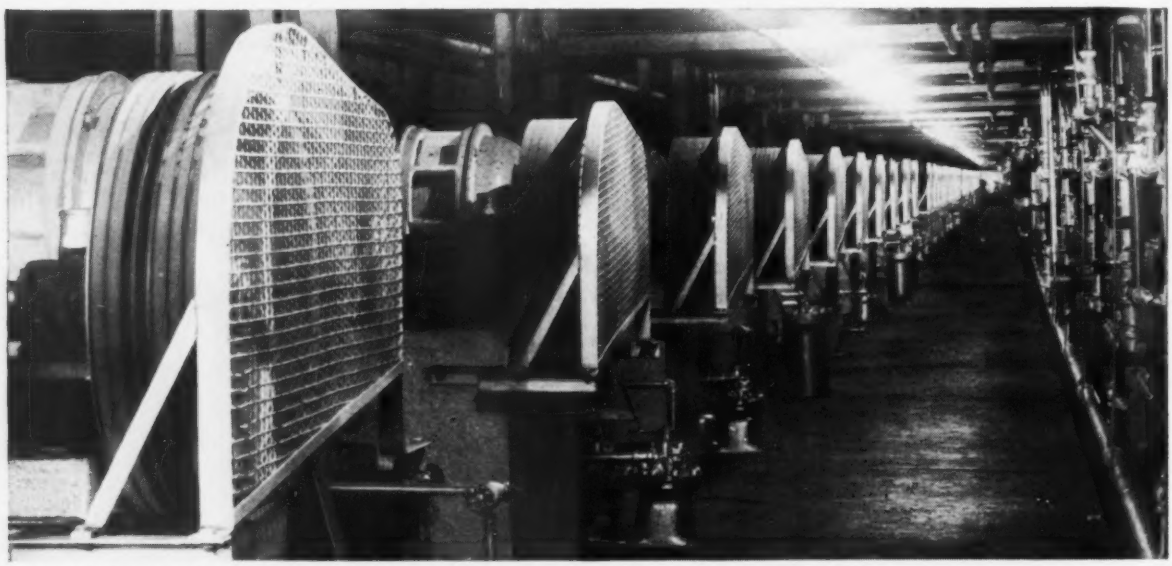
Standard Engineer's Report

CASE HISTORY

PRODUCT *Calol SA Grease*

FIRM *Edward Hines Lumber Co., Hines, Oregon*

Calol SA Grease ends loss of kiln-motor bearings!



RUNNING IN AIR TEMPERATURES AS HIGH AS 150°F., not a single bearing in these 40 kiln-blower motors has failed since they were changed to Calol SA Grease more than 3 years ago. Before using this special high-temperature-resisting grease, other greases tried by the Edward Hines Lumber Co. melted and ran out of the ball bearings, causing wear and eventual seizure. Stable Calol SA Grease maintains proper consistency, stays in place even when kiln heat circulates around the motor. Bearings are repacked every 2 years in spite of high ambient temperatures in the tunnel beneath the kiln house.

POND FED BY HOT SPRINGS does not freeze in sub-zero winters at this mill. All operations are under cover—mill hasn't missed a full 48-hour week in 12 years. The safety record here leads the industry.

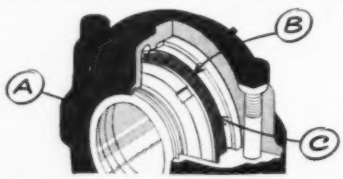
FREE CATALOG: "How to Save Money on Equipment Operation", will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write to 225 Bush Street, San Francisco.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

How to reduce wear in all types grease-lubricated machine bearings



Specialized Calol SA Grease will provide constant lubrication in high ambient and bearing temperatures—proved in mill ambient temperatures of 250°F. and Navy Ball Bearing Machine tests of 10,000 rpm and extreme temperatures.

A. Made from sodium-aluminum base...very high melting point minimizes seepage.

B. Feeds evenly to all bearing surfaces.

C. Remains soft in cold temperatures.

STANDARD OIL COMPANY OF CALIFORNIA

tations in building codes may require a more expensive type of construction than the owner wishes, may oblige the plant to be sprinklered at an expense the owner wishes to avoid, or may call for breaking up a desired large space by firewalls, which in some industries would be unworkable, as in a foundry.

The character, competence, and judgment of the architect-engineer is highly important, said Mr. Grant, and he should be selected because of his reputation for successful solutions of similar problems of plant construction. A written agreement covering the services to be performed and the compensation therefor, should be executed at the time of his selection.

Why preliminary plans?

In altering or adding to an existing plant, the effect of the additional space on the existing mechanical and electrical features is all too often overlooked, according to C. Day Woodford, architect, Los Angeles, of the firm of Parkinson, Powelson, Briney, Bernard and Woodford.

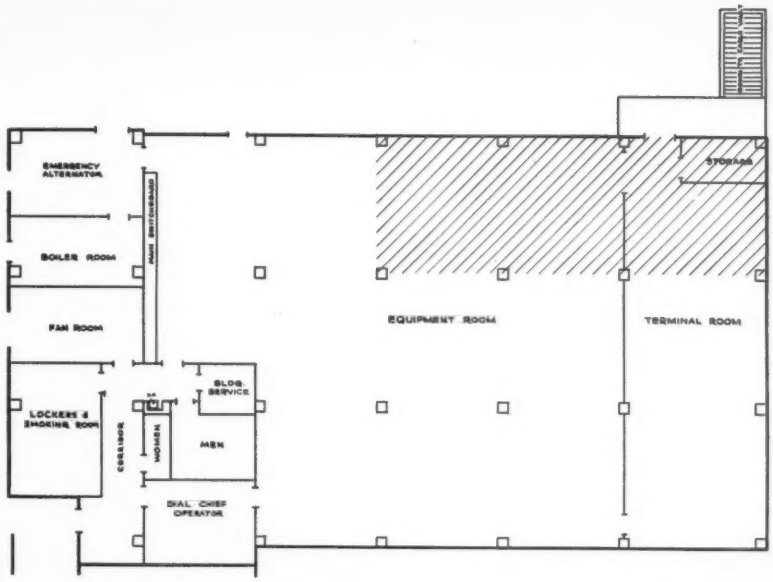
He described preliminary plans as not something quickly put together by the owner or one of his employees, but the actual transition of the program requirements, the budget controls, and site conditions into a usable and workable arrangement in which a specified operation can be accomplished. In other words, not *drawings*, but *ideas* and the *development of ideas*.

These ideas do not come from one man, but from a team of which the architect is the captain and the other members are the engineers—soil, civil, electrical, mechanical, etc.—the realtor, banker, insurance advisor and builder. Most important of all is the owner, although most of the time he fails to realize that he is a member of the team.

Example, wind tunnel

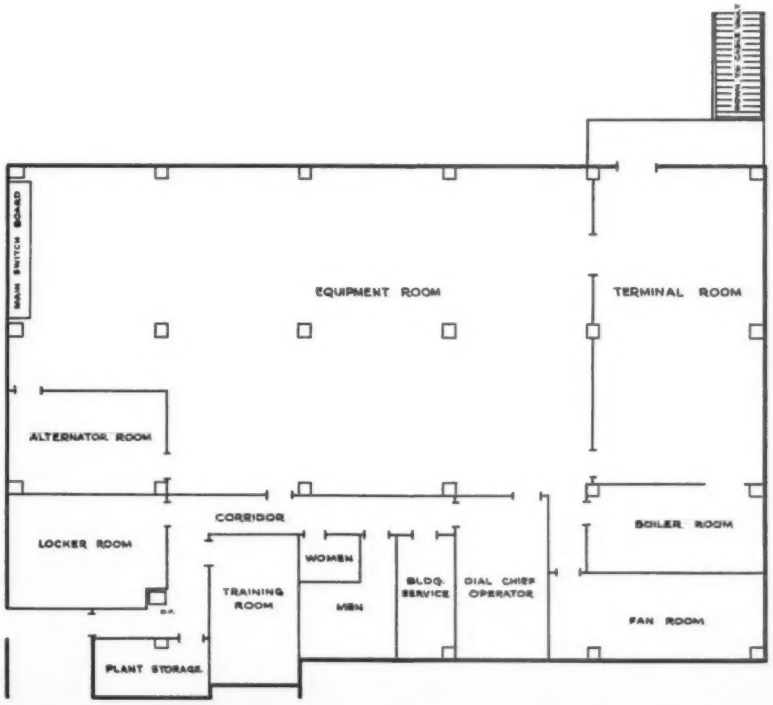
Mr. Woodford cited as an example Caltech's wind tunnel, where the Caltech people working on their own were plagued by lack of space, particularly to keep equipment while not in use. When architects were called in, re-designed space solved the problem.

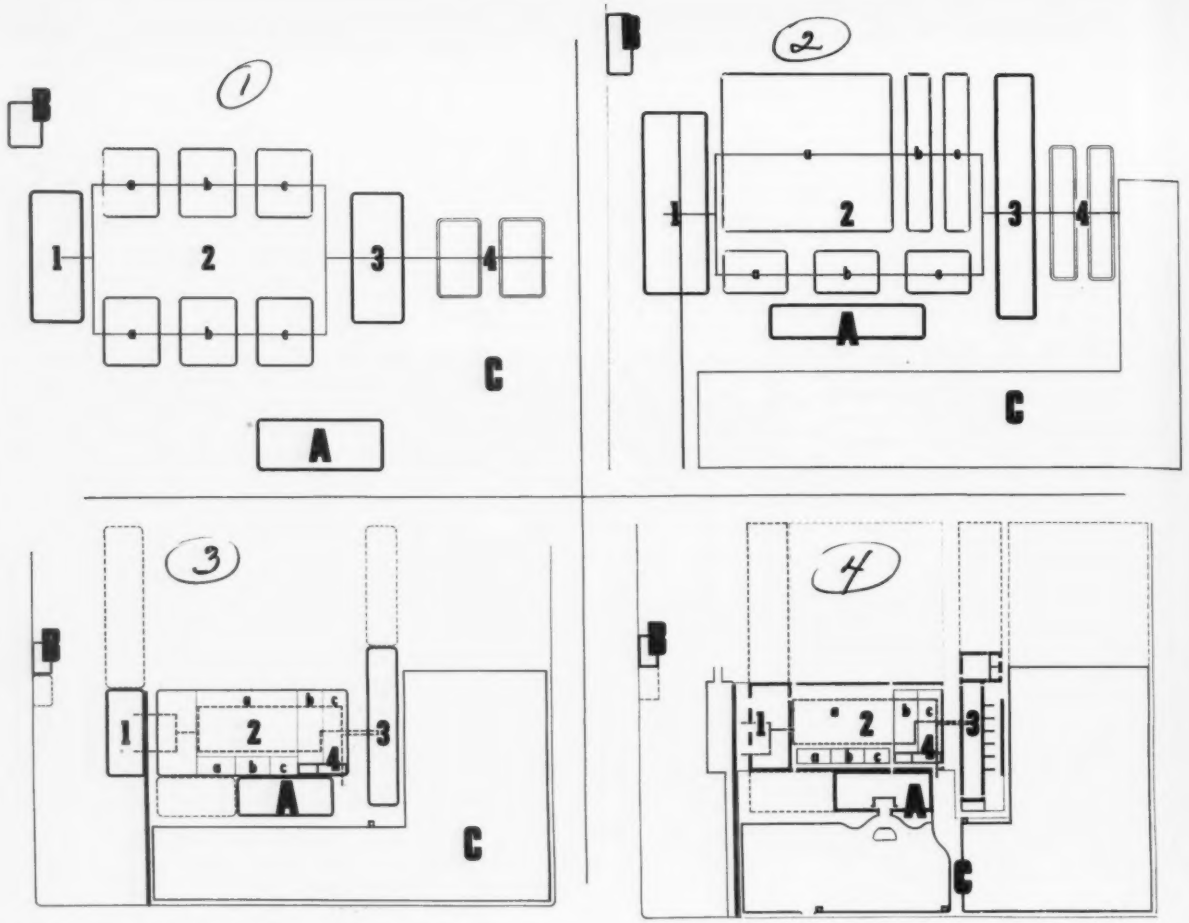
For provision against future expansion, he exhibited a sketch of the use of metal wall panels designed to permit completion of an addition before needing to be removed. Removal can then be accomplished



ABOVE: How savings in structure and space layout work together. At the outset this building, roughly three bays wide, five bays long, was to be of reinforced concrete flat slab construction. Although it was found that three bays along the way (shaded portion) could be eliminated, this would make flat slab impossible and cost $7,000 extra.

BELOW: Building was completely restudied for equipment and space layout, so the three bays could be eliminated on the short end, leaving smaller rectangular flat slab building with true savings.





FOUR STAGES of master planning. (1) Establishing relationship of elements without regard to relative sizes. (2) Sizes of elements correlated with relationships, adjusted to topography of the land. (3) Areas defined into realistic shaped blocks, with defined circulation and access. (4) Final definition of elements, initial and future construction, and open area development. Key to lettering is: (A) Administration; (B) Garage and maintenance; (C) Parking; (1) Dock and warehouse; (2) Main factory; (a) Fabrication; (b) Subassembly; (c) Final assembly. (a) Tooling; (b) Processing; (c) Trucking and blue print; (3) Engineering lab. (4) Inspection and shipping.

without the mess of demolition.

Master planning was summarized in four stages by S. Kenneth Johnson of Daniel, Mann, Johnson and Mendenhall, architects, Los Angeles, as follows:

Stage 1. Establish desirable relationships of the various areas of land uses. Proper relative sizes unnecessary at this stage of the game.

Stage 2. Develop the sizes and shapes of areas, and relate them to topography, including roads, rail spurs, drainage, easements, wind conditions, etc. Such a layout will not only be more functional and economical, but more attractive than one based on some arbitrary pattern.

Stage 3. Define the areas into blocks and define circulation and access.

Stage 4. Locate and define outlines of structures and groups of structures, locate access and circulation, define open areas for privacy, protection, landscaping, parking, etc. Define initial construction program and allocate future construction and development.

OUR BEAUTIFUL L. A. industry

THE PROLIFIC Los Angeles Chamber of Commerce has come up with another new theme, "Industry Can Be Beautiful." The Republic Supply Co. of California has been awarded a trophy in the Los Angeles Industrial Beautification Awards Contest sponsored by the Chamber. The trophy, second prize in the Wholesale Distributors Sales and Storage Division of the contest, was given for "outstanding design in landscaping and planting" surrounding the company plant in the central manufacturing district.

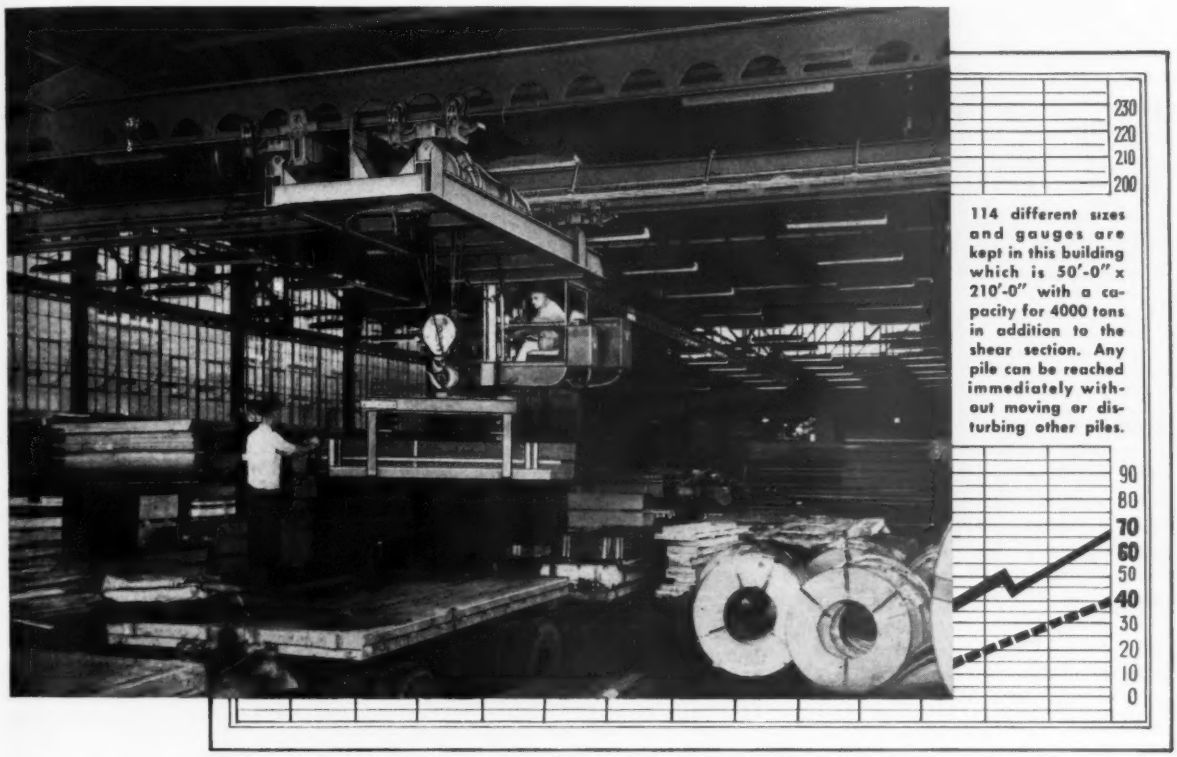
This latest recognition of Republic Supply's beauty adds to the international attention focused on the company by virtue of having recently received a National Award of Merit from the American Inst. of Architects.

ELECTRONIC FIRM wins landscape award

THE NATIONAL "Plant America" Award of the American Association of Nurserymen for industrial landscaping and beautification was formally presented to Consolidated Engineering- Corp., recently. Concern's headquarters are located in Pasadena, California.

Crane Cuts Steel Handling Costs 66⅔%

Boosts Shear Production 40%



Up to 15 truck loads, or 150 tons of incoming steel are handled in a day by a 5 ton, 48'-0" span, 3-runway Cleveland Tramrail crane in the warehouse of the Art Metal Construction Co., Jamestown, N. Y., well-known manufacturers of office furniture. This formerly was lifted off the trucks with a chain hoist onto floor trucks which handled it thereon.

The new Tramrail Crane takes the steel directly from trucks to storage without re-handling, and, also, from storage to shears. One man in the crane cab and another on the floor take care of the entire steel handling job. The man-hours required for this have been cut to one-third.

An extra advantage, not originally anticipated, has been the increased output of the six shears. Formerly, it was necessary for the shear operators to haul the steel they cut, from storage to their machines. Now this is done by the crane. As a result, the shears are in operation more of the time and shear production has been increased 40%.

Properly engineered overhead Tramrail equipment can be such an important factor in lowering costs and securing other advantages that we urge you to have a nearby Cleveland Tramrail representative check your handling methods.

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ELECTRICAL equipment in operation picks up dirt and grease which is hard to remove under ordinary cleaning methods, necessitating the use of high pressure steam with strong cleaning compounds to get results.

MAINTENANCE . . .

once a liability, now a necessity

By RUSSELL L. SALING

Pacific Coast Regional Maintenance Supervisor, Westinghouse Electric Corp., San Francisco

ALMOST everyone will agree today that maintenance of one kind or another is responsible for the continued operation of all types of industry. Since industry is fast becoming electrified and we have arrived at what some have termed the Pushbutton Age, maintenance problems have multiplied tenfold.

Prior to World War II, maintenance was looked upon as a necessary evil and very little was done to solve or systematically approach this ever-increasing problem. Wartime experiences of industry awakened management to the vital necessity of doing a better job maintenance-wise if industry was to meet its requirements on military equipment, munitions, and civilian goods. It was evident that equipment on hand had to do a better job, as new production machinery required high priorities that were not only difficult but many times impossible to obtain.

Interest rises

This condition brought about an increased interest in proper maintenance and overnight this previously controversial subject became one of the most important factors in keeping plants operating.

Industry's concept of the true meaning of maintenance changed, because of wartime necessity, and this attitude has continued in the postwar years.

Industry approached this problem through a preventive maintenance program, and complete maintenance organizations were created. Management established schools to properly train personnel to recognize troubles before they occurred, rather than wait for equipment to break down. Regular schedules of inspections, based on equipment used, were set up that prevented expensive shutdowns.

Manufacturers participated in this program by assisting industry to train its personnel by conducting their training schools, arranging shop tours so that those directly associated with plant operations could witness new processes at first hand, and by supplying technical data on installed equipment.

This combination of effort by industry and manufacturers not only produced the desired results but helped reduce maintenance costs. For example, one large industry in the Pacific Northwest decided after analyzing their particular manufacturing operations to completely reorganize their maintenance program to reduce equipment failures and to increase production. This reorganization included reducing their motor repair shop personnel to one man to handle breakdowns of extreme emergency, and all others were assigned to preventive maintenance activity along with those already engaged in this function.

To accomplish this, a master card system was set up listing each piece of equipment on an individual card. At regular intervals, indicated by colored tabs on each group of cards, maintenance personnel inspected the equipment and reported findings on forms provided for this purpose. All repairs needed, as reported by the inspection, were immediately carried out. Suggestions for improving operations were then taken under advisement and all pertinent information tabulated on the master card.

Because of their experience, this industry will continue and expand their preventive maintenance program. Since their present program has been put into effect, they have eliminated many breakdowns that would have occurred under the old system. They believe that proper maintenance of equipment can be measured in the quantity and quality of a product.

Westinghouse early in its history recognized its responsibility to industry by establishing forty combination manufacturing and repair plants throughout the nation to properly service customers' equipment. There are five such plants within the boundaries of the Pacific Coast Region, at strategic locations, well equipped and adequately manned to offer every repair facility to industry.

Technical problems solved

In addition, a corps of field engineers have been made available for technical problems and to assist on repair jobs that are accomplished at the customers' plants. Manufacturing facilities have been provided for making both current and non-current types of renewal parts, and warehouses have been set up so that parts will be available when needed by customers.

Industry can be sure that manufacturers will continually strive to assist in improving maintenance techniques, to increase production and reduce costs of operation.

Suppose we put the Dempster-Dumpster System right down in your plant . . . then what?

● *Well First—let's make it clear that we are furnishing you with several sizes of different designs of 26 containers to suit your materials requirements. Then bear in mind that we are delivering you only one truck-mounted Dempster-Dumpster and with your driver this one outfit picks-up, hauls and dumps all containers, about like the one shown above.*

Now, how many conventional trucks are you using for handling rubbish, scrap, raw materials, and what have you?

For several years now, one plant has been doing considerably more work with two Dempster-Dumpsters and two men than they did with five trucks and fifteen men before the Dempster-Dumpster System was installed. You can guess at the approximate savings annually.

A glance at the picture below and you get the whole story of the Dempster-Dumpster System. Never before have you been able to cut bulk materials handling costs so drastically.

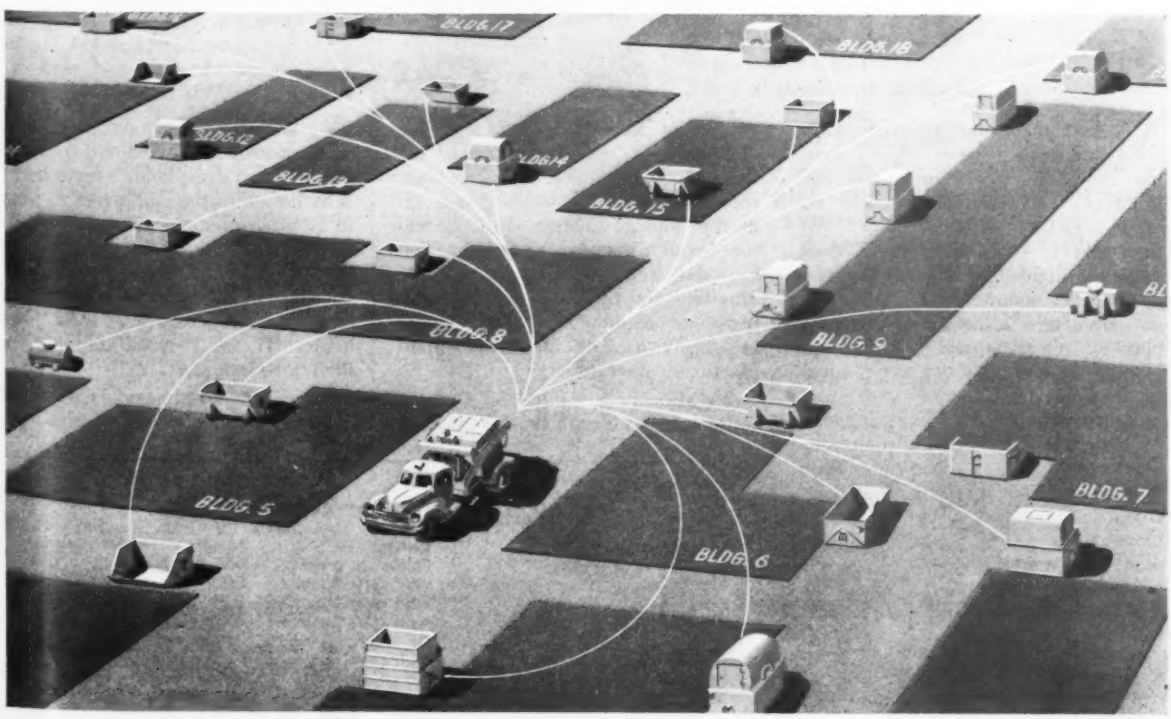
One truck mounted Dempster-Dumpster handles the entire group of 26 Dempster-Dumpster containers. These big, detachable steel containers are like having 26 truck bodies for a single truck.

Any required number of Dempster-Dumpster containers are spotted at convenient materials accumulation points inside and outside your buildings. They range in sizes up to 12 cu. yds.—3 to 4 times the capacity of a regular dump truck. Materials—bulky, light, heavy, solids, rubbish and even liquids—are dumped or placed into these containers.

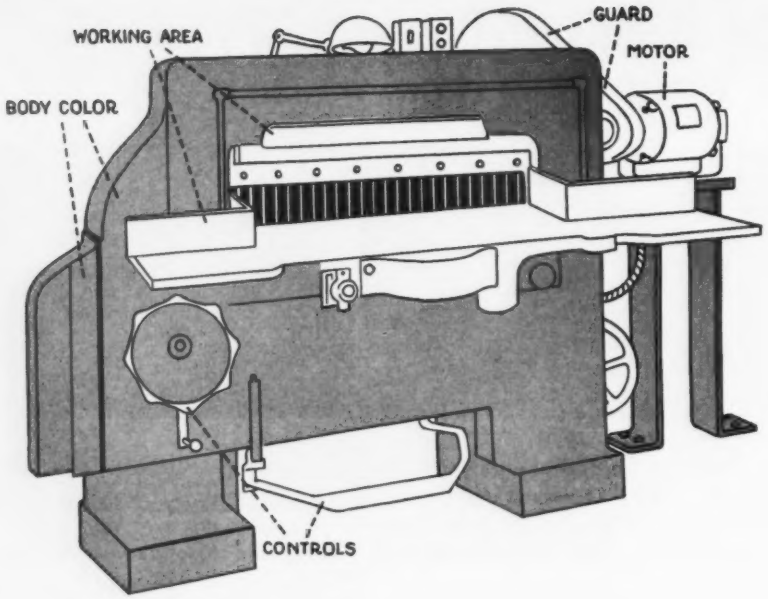
The truck mounted Dempster-Dumpster makes scheduled rounds, picks up each preloaded container, carries it to the point of disposal, sets it down intact or dumps the materials and returns the container for refilling. The entire operation is hydraulically controlled and handled by your truck driver.

It's as simple as we have described it. The amazing thing is the tremendous savings being made by the Dempster-Dumpster System in hundreds of leading industrial plants over the nation.

A product of Dempster Brothers, Inc.



DEMPSTER BROTHERS, 564 N. Knox, Knoxville 17, Tennessee



OPERATING equipment is customarily given a body color in grey tones of green blue, or pale grey, while the working or focal area is a lighter shade, often cream for greater visibility to the operator. Guards and control devices are yellow or orange to indicate that only one man should handle them. Electric motors or conduit lines can be blue or grey-blue, while the push button for stopping the machine should be red.

How to use color for MAINTENANCE, SHOWMANSHIP

By A. S. HERZIG, Industrial Division, Pabco Products Inc., San Francisco

MANY plant managers now think in terms of color. They reason like this: "Since we must paint our buildings and equipment every so often, why not use more color? We find that it costs little more than using the same color everywhere, and it offers us many advantages. Why not also have a color maintenance plan for all areas and units in our plant? It will be more economical in the long run."

Pabco Products Inc. have suggested maintenance plans for many industries, bringing in the use of paints, building materials, roofing, and floor covering. Such a plan always saves money because every surface in the plant is renewed not too often, not too seldom. An important part of this plan deals with the proper and full use of color.

Advantages of color

There are several distinct and separate tasks that a color plan offers. First, color is employed to identify equipment for safety and efficiency of operation. Next, color is used for decoration and making restful surroundings, with the proper light reflection and good taste. Another feature is showmanship and distinction by using well-selected two-tone combinations for the exteriors of buildings and equipment. Finally, there are special uses of color to aid manufacturing operations.

We always point out this: Just because it is a plant interior, or a testing laboratory, or a warehouse office, or a washroom, why should the walls be the same drab color everywhere? Why not allow the employees to work in an atmosphere as pleasant as their own homes? It's a safe gamble that they would do better work. Well-selected colors might even give them ideas for redecorating their own homes. If so, they might stay on their jobs longer.

There are customary or universal colors recommended by the National

Examples of color combinations

Floor covering	Walls	Ceilings	*Accent or two-tone color
Modified buff	Ivory	Pale slate grey	Redwood brown
Light green	Arrowhead green	Wall color lightened	Off white
Grey	Mist green	Wall color lightened	Coral
Rose beige	Carmel blue	Wall color lightened	Rose coral
Dark green	Pale yellow	Off white	Orange red
Modified buff	Slate grey	Wall color lightened	Deep brown
Tile red	Straw	Off white	Indian red
Dark green	Rose coral	Wall color lightened	Powder blue

*Accent colors are to be used on small areas, such as a small wall opposite the windows, or the base board.

Safety Council and other organizations for identification. Hues are divided into two classes, "warm" or "accent" colors and "cool" or "safe" colors.

The first group ranges from yellow through red-violet, and is useful for identifying dangerous (or very valuable) materials, and for attracting attention to a piece of equipment. The second group is useful for identifying pipe lines and equipment that are not dangerous.

For example: it is customary to reserve red for fire equipment. Usually a red background is painted behind fire hose reels or chemical extinguishers. Sprinkler lines, if not painted solid red, at least have the sprinkler heads in red. Green means first-aid equipment, usually done by painting a green background behind first-aid boxes, etc., or a green cross on first-aid rooms.

Yellow (or orange) is the "caution" color for moving or stationary equipment that might cause an accident. Yellow stripes are reserved for very hazardous places. (Yellow is considered better than orange since it harmonizes more with other colors.) White is often used to paint refuse containers, as it suggests cleanliness.

Two shades of the same color are not recommended, as they might be confusing. Industries having many different pipe lines to identify, use combinations of colored bands. Or, they use stencils and decals to supplement color. For example: if chlorine lines are painted orange, they are stenciled "LIQUID" or "GAS" to identify them. If conduit lines are painted blue, the voltages of each are stenciled on the proper line.

We have assisted in working up special code color systems for industries. In this connection it is well to point out that a complication of code colors always harmonizes from an artistic point of view. They do not "clash" for the simple reason that they are spread out in a large room. They look neat.

When a manufacturing plant decides to "clean up and paint up," do the employees like it? They do, especially the old-timers! Of course before the colors are selected, it's a fine idea to have a conference on what colors will be the most popular.

Decoration and restfulness

Books have been written on this phase of the use of color. Applying the subject to industry, let us say that *if* there are any rules, the chief rule would be to offer color combina-

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tions that the owner and his employees would like best. Most paint manufacturers are able to suggest tasteful and appealing color combinations. Pabco Decorator Tones for example, offer combinations by the hundreds, including floor covering patterns that harmonize with the wall colors.

The present trend in color for interiors is toward modified tans, beige, warm grey, with a dash of pale yellow (or straw) and brown, for both paint and floor covering. The reason: interior finishing of offices, shops, and homes employs more natural wood finishing in the form of wall panels and exposed wood floors. The owner can have any colors he wishes, although the manufacturer should be aware of the trends.

For offices *and factory interiors* variations of pale green, beige, very pale yellow, and pale brown are more accepted. For plant cafeterias cream, pale rose coral, and Indian red or brown are (believe it or not) appetizing. For women's lounges in a factory or office, rose coral (not pink) trimmed with pale grey-blue will be liked.

For large plant interiors or warehouses it is important to keep the ceilings white or a pale shade, avoiding a variety of color. The reasons: (a) maximum light reflection, (b) makes the ceiling appear high, and (c) requires less maintenance expense.

Showmanship

By using *carefully planned* color combinations for the outside of buildings, tanks, and other equipment, the manufacturer is safe in the knowledge that people driving cars or traveling in trains—even planes—will recognize the plant even before they read the sign on the buildings. This is doubly true if there are branch plants in other localities having the same colors.

Exterior colors also employ body shades, two-tone or alternate shades, and accent colors. They are carefully selected by logical comparison. Any mistake should be made in the planning stage, not on the actual job, so we always submit a color drawing before any decision is made, because that is the only way the plant manager can see how it will look. Few people are able to visualize a color layout unless they see a color drawing or colored photograph close at hand.

Labor is the major cost of painting, materials the minor cost. So why not paint with selected colors containing the most durable pigments?

This subject involves methods of employing colors that manufacturers do not care to divulge, so they can be mentioned only in generalities, with a few exceptions.

Unusual uses

Those who intermix chemicals or compressed gas can use color as a follow-through guide to expedite their operations. Tanks, valves, and pipe lines can be finished with various colors in enamel to avoid mistakes in these exacting operations. A study of the equipment is made before working out the plan, which is then submitted as a diagram.

In a factory building having more than one room or department under one roof, with glass partitions or large doors between the rooms, each room can contrast with the next, providing the colors harmonize.

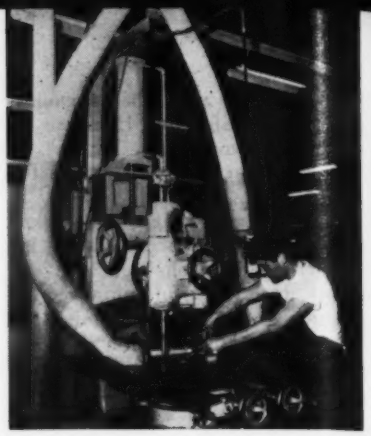
Pale yellow will contrast but harmonize with pale grey-blue. The dado line near the floor should be a darker shade than the wall tint. Such a plan will not only identify the departments, but will display a pleasing sight to visitors, and that's what every manufacturer wants to accomplish.

Now hear this: an industrial salesman has many accounts to call on. He must see them not too often, not too seldom, and he must keep down his driving mileage. So he divides his territory into sections on a map, coloring each section differently. In his master record book he places tabs colored to match each section of the territory.

Suppose he must suddenly go to one spot on urgent call. Should he drive there and back to take care of something that would take only half a day? No. When he is finished, he looks through the green (or red or yellow) tabs in his book to see what other work he can do in that neck of the woods while he is there. Even if there is only one other chore he can do, it will save him driving back next week.

NOSE FOR QUALITY

RESEARCH with a laboratory "nose" at the University of California Medical Center, San Francisco, suggests that practical methods may be at hand to determine precisely the quality of food by its odor. The nose, developed several years ago for detection of fish spoilage, could be used for fine grading of vegetables, fruit, cheese, butter, coffee, spices, and pepper as well.



FINE particles are picked up by the ducts on sides of the machine bed and dusty air is carried to collectors outside.

Improved DUST CONTROL

A NEW TECHNIQUE in dust control at Boeing Aircraft Co., Seattle, has meant large savings for that company. Dust control has long been practiced in the wood and pattern shops there, but a centrifugal-type dust collector alone was formerly employed and as a result, the ventilating air could not be returned to the plant as was desired.

Although that collector had high enough efficiency to remove much of the larger-sized particles of dust, it was insufficient to remove all of the fine sawdust and metal particles, so the air had to be exhausted to the atmosphere. This practice was undesirable for a number of reasons, one of which was the waste of heat in the air.

It was proposed that another collector, one of very high efficiency with small particles, might be used to further clean the effluent from the collector already in use. Cloth filtration was selected for that job because of its ability to remove minute particles from air with efficiencies around 99%.

A collector manufactured by American Wheelabrator & Equipment Corp., Mishawaka, Ind., was installed. It has hundreds of cloth-tube-type filters. The filtered air is now found to be so clean that the company is recirculating it back into the plant.

As was desired, much heat formerly lost is now saved. It is estimated that the present recirculation set-up will effect a reduction of approixmately $5,400 annually in the cost of steam heat. The saving in cold weather is expected to be approximately 2,400 lb. of steam per hour, which is enough to heat 24 average size homes.

You Get Greater Flexibility Without Costly Installations When You MECHANIZE MATERIALS HANDLING With Tractor Shovels

When you put an Allis-Chalmers Tractor Shovel to work around your plant, it starts paying its way immediately. There is no down time for installation or costly plant alteration . . . no long training course for the operator. What's more, this one-operator machine not only saves many man hours, it gives you the benefit of several specialized units in one.

As Materials Handlers, Allis-Chalmers Tractor Shovels, with capacities from one to four cubic yards, pick up and carry all types of bulk, solid or packaged loads and deliver them anywhere in or around the plant. Storage areas may be changed at will. Special attachments — Lift Forks, Rock Forks, Bulldozers and Angledozers plus many others for some models — may be interchanged with the bucket in about 20 minutes.

As Prime Movers, these powerful crawler tractors can pull, lift or skid heavy machinery, spot railroad cars at loading docks. Traction and flotation enable these machines to work in snow or mud where wheel-mounted equipment bogs down.

As Maintenance and Construction Machines, Allis-Chalmers Tractor Shovels handle general clean-up work around the plant, build plant roads, excavate for new construction, clear snow . . . keep busy repaying your investment winter and summer.

Ask your Allis-Chalmers dealer to show you how the versatile Tractor Shovel is helping cut costs for thousands of owners. There are four sizes to fit your needs from the one-yard HD-5G to the four-yard HD-20G with torque converter drive.

Write for catalog describing the use of tractors in modern materials handling.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

LUBE SCHEDULE based on individual machine study

. . . *requirements are then systematically followed up*

LUBRICATION schedules at The Western Mineral Products Company in Denver are based on individual study of the conditions under which each piece of equipment operates. From this study a series of check charts was developed to show frequency of lubrication.

The charts were worked out by William G. Phebus, plant manager, the chief maintenance engineer of the company, which also has plants in Minneapolis, Milwaukee, and Omaha, and the plant maintenance mechanic. They went over every piece of equipment, discussed its time in use, weather when used most often, starting and running loads, dust and dirt conditions, and all other factors that would affect operation. Complete charge of all equipment, maintenance, and repair is vested in the maintenance man. When making his daily rounds of the plant he carries the check charts for daily, semi-weekly, weekly, semi-monthly, and monthly chores, and dates the chart to show that he has serviced the variously numbered grease and oil fittings of each machine.

What he checks

While servicing the equipment it is his duty to feel and check gear boxes and motors for excessive running temperatures, listen for odd noises and squeaks, and check general operating conditions. At the end of the week the check charts are turned over to Mr. Phebus, with any reports on unusual conditions or changes.

"I would like to say that the program works," says Mr. Phebus. "Of course any program would be useless without a good man on the job, and I feel that ours works so very well because of the good work of Art Dean, the maintenance mechanic at our Denver plant."

The lubrication schedules, as shown on the check charts, are as follows:

Daily servicing

Ore screw conveyor
- Center bearing

Draver feeder
- Main shaft
- Ratchet connections

Sewing equipment
- Sewing head
- Automatic control lever

Tape machine

Hyster fork lift truck
- Fill gas tank
- Capacity—5 gallon

Distributor
- Turn down grease cup one half turn daily

Twice a week

Power shovel
- Drum-shaft-clutch-trip

Ore elevator
- Boot shaft bearings

Under silo conveyor
- Head bearings
- Tail bearings

Distributor mechanism
- Pulleys

Ore conveyor
- Tail shaft bearings

Finish product elevator
- Boot shaft bearings

Weekly servicing

Power shovel
- Drum-shaft-clutch-trip
- Sheaves—swivel
- Single
- Double
- Car

Under silo conveyor
- Troughing pulleys and guide rolls

Oil pump
- Pump

NVX feeder
- Counter shaft
- Head shaft bearings
- Tail shaft bearings

Acoustical plastic mixer
- Tail shaft bearings

Office heating plant
- Water pump

Hyster
- Battery—Check
- Air cleaner
- Check tires—pressure 95 lb.
- Clean cable chain and oil
- Distributor
- Add oil to oil cups
- Fill grease cup

Twice a month

Ore screw conveyor
- Head shaft bearings

Finish product elevator
- Head shaft bearings

Hyster
- Roller tracks—Clean and grease

Once a month

Rock separator
- Motor and blower

Vent cyclone
- Blower

NVX feeder
- Motor
- Gear reducer—Check
- Roller chain—Clean and grease

Sewing equipment
- Sewing machine motor
- Conveyor motor
- Gear reducer—Check
- Roller chain—Clean and grease
- Head shaft bearings
- Tail shaft bearings

Four wheel truck
- Wheel bearings

Acoustical plastic mixer
- Gear reducer—Check

Lawn mower

Hyster
- Engine—Change oil, change filter
- Brakes—Check fluid
- Trans. and diff.—Check
- Hydraulic oil—Check
- Gen.-starter-dis.—Check
- Lift rollers
- Clutch bearing

Power shovel
- Gear reducer—Check
- Roller chain—Clean and grease

Ore hopper
- Wheels

Ore screw conveyor
- Gear reducer—Check
- Roller chain—Clean and grease
- Tail shaft bearings

Ore elevator
- Head shaft bearings
- Gear reducer—Check
- Roller chain—Grease and check

Distributor mechanism
- Lever brake
- Wheels

Under silo conveyor
- Gear reducer—Check
- Roller chain—Clean and grease

Draver feeder
- Motor
- Gear reducer—Check
- Roller chain—Clean and grease

Ore conveyor
- Gear reducer—Check
- Roller chain—Clean and grease
- Head shaft bearings
- Trough pulleys and guide rollers

Finish product elevator
- Gear reducer—Check
- Roller chain—Clean and grease
- Motor

Every three months

Air compressor
- Compressor—Check

Welder
- Wheels

Hyster
- Trans.-diff. and chassis—Change

Every six months

Air compressor

Under silo conveyor
- Motor

Oil pump
- Motor

Vent cyclone
- Motor

Air compressor
Filter—Clean
Acoustical plastic mixer
Head shaft bearings
Vent—furnace room
Fan shaft bearings
Office heating plant
Water pump motor
Hyster
Steering wheel and wheel bearings
Gas pump motor
All overhead and sliding doors

Yearly servicing

Power shovel
Motor
Gear reducer—Change
Ore elevator
Gear reducer—Change
Under silo conveyor
Gear reducer—Change
Draver feeder
Gear reducer—Change
Ore conveyor
Gear reducer—Change
Burner blower
Motor and blower
Finish product elevator
Motor
Gear reducer—Change
Sewing equipment
Gear reducer—Change
Wheel barrows—Check
Acoustical plastic mixer
Gear reducer—Change
Vent. furnace room
Motor
Bench grinder
Motor shaft bearings
Welder
Lower bearings
Upper bearings
Brushes—Replace
Plant fan
Motor bearings
Office floor polisher
Motor
Gear box
Gear box
Motor
Electric drill ½ and ½
Laboratory sifter
Motor

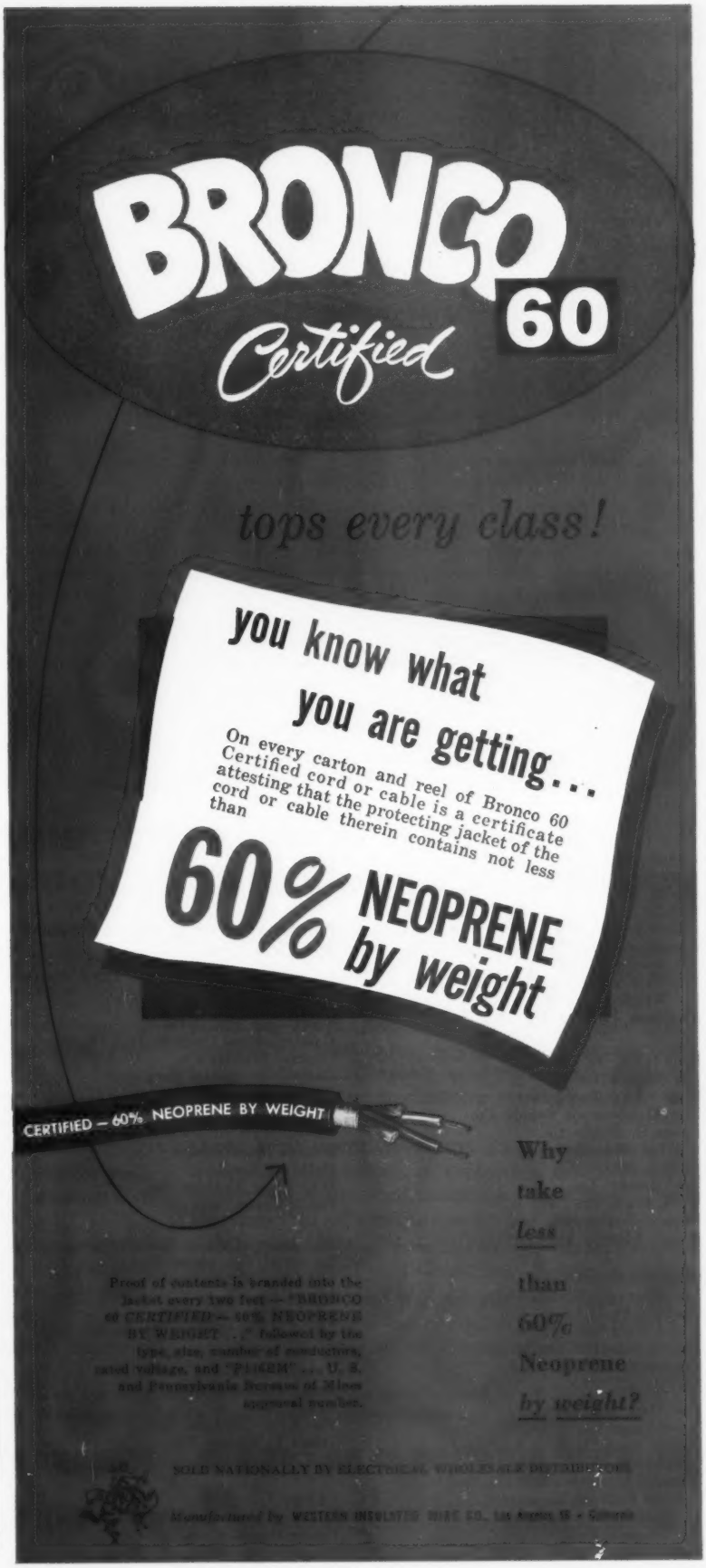
Five year servicing

Ore screw conveyor
Motor
Ore conveyor
Motor
Ore elevator
Motor
Air compressor
Motor
Acoustical plastic mixer
Motor

FIRE EQUIPMENT grows with West

GROWTH in population of the eleven Western states in the past few years has been accompanied by a corresponding growth in both quality and sales of the products of the fire extinguisher industry.

These improvements have included the use of stainless steel tanks, better valves, improved nozzles, more careful workmanship, and careful testing.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Certified
tops every class!
you know what you are getting...
On every carton and reel of Bronco 60 Certified cord or cable is a certificate attesting that the protecting jacket of the cord or cable therein contains not less than
60% NEOPRENE by weight
CERTIFIED — 60% NEOPRENE BY WEIGHT
Why take less than 60% Neoprene by weight?
SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS

MAINTENANCE SHOW has big exhibitors list . . .

Wide line of products, equipment, and services will be displayed

AS the Western Plant Maintenance Show at Pan-Pacific Auditorium in Los Angeles July 13-15, with the concurrent Western Plant Maintenance Conference on July 13 and 14 at the Hotel Ambassador, will be one of the most outstanding services to industry in the West up to the present time, the attention of readers is called to the show ticket bound into this issue and to the special section listing literature and products to be displayed at the show, page 180.

So many of the Western industrial plant facilities are new, as a result of the West's great expansion in the last 15 years, that operating and maintenance methods can be used that are not practical elsewhere in the country.

"Maintenance involves so many types of products and services," says Harold C. McClellan, president of NAM, and of Old Colony Paint Co. in Los Angeles, "that it is almost impossible for the average owner, superintendent, engineer, operator or manager to be informed of them except through such events as the Western Plant Maintenance Show and the Western Plant Maintenance Conference."

EXHIBITORS LIST (AS OF MAY 21, 1954)

A

Aero-Coupling Corp.
Aerol Co. Inc.
Airkem, Inc.
Alan Wood Steel Co.
Albina Engine & Machine Works, Inc.
Alemite Sales Division (Stewart-Warner Corp.)
American Chain & Cable Co., Inc.
American Chain Div.
Wire Rope Sling Dept.
Wright Hoist Div.
American Pullmax Co. Inc.

B

Band-It Co.
The Bassick Co.
Beaver Pipe Tools, Inc.
Best Maintenance Supply Co.
James G. Biddle Co.
Big Joe Manufacturing Co.
Bil-Jax, Inc.
The Boman Co.
W. N. Brady Co.
Branson Instruments, Inc.
Breuer Electric Manufacturing Co.

C

Cable Distributors, Inc.
The Capewell Manufacturing Co.
Chemical-Proof Corp.
Clarin Manufacturing Co.
The Cleveland Worm & Gear Co.
Commercial Filters Corp.

D

The Dampney Co.
Degen-Fiege Co.
Detroit Steel Products Co.
DeVilbiss Co.
Diamond Expansion Bolt Co., Inc.
E. I. du Pont de Nemours & Co., Inc.
Rubber Chemicals Dept.
Grasselli Dept.

E

Easterday Supply Company
Encyclopedia Britannica
Equipment Engineering Services
Equipment & Materials Reporter
Eriez Manufacturing Company

F

Factory Management and Maintenance
The Farval Corp.
The Felters Co.
Finnell System, Inc.
Foster Manufacturing, Inc.

G

Gaines-Collins, Quijada Tool Division
General Electric Co.
General Petroleum Corp.
Jules D. Gratiot Co.
Gyroseal Valve Corp.

H

Hansen Manufacturing Co.
Heli-Coil Corp.
Hild Floor Machine Co.
Honan-Crane Corp.

I

The Imperial Brass Manufacturing Co.
Industrial Equipment News
Industrial Maintenance
Inertol Co.
Insul-Mastic Corp. of America
International Business Machines Corp.

K

Kalman Floor Co.
Kelite Products, Inc.
Kenco, Inc.
The Kent Company, Inc.
James P. Kinney Co.
D. L. Kissell Refrigeration Co.

L

Laduby Co., Inc.
Lambert Company, Limited
Larsen-Hogue Electric Co.
Walter G. Legge Co., Inc.
Lincoln Engineering Co.
Loomis Machine Co.

M

Magnaflux Corp.
Maintenance Magazine
Mayhew Products Co.
Modern Manufacturing Co.
Motorola, Inc.
Multi-Clean Products, Inc.

N

National Industrial Service Assn.
New Hermes Engraving Machine Corp.
Newman Manufacturing & Sales Co.
New York Belting & Packing Co.
C. A. Norgren Co.

O

Oakite Products, Inc.
The Oster Manufacturing Co.
Owatonna Tool Co.
Owens-Corning Fiberglas Corp.

P

Palmer Scaffold Co.
The Patent Scaffolding Co., Inc.
Petley, Inc.
Porta-Fold Co.
Porter Cable Co.
The Protectoseal Co.
Punch-Lok Co.

Q

Quaker Maintenance Co., Inc.

R

Radio Corporation of America
RCA Victor Division
RCS Tool Sales Corp.
Remington Rand, Inc.
The Ridge Tool Co.
H. H. Robertson Co.
Rust-Oleum

S

Seating, Inc.
G. D. Smith Co.
George W. Snibbe Sales Co.
The Spencer Turbine Co.
Sperry Products, Inc.
Standard Dry Wall Products
The Stanley Works—Magic Door Div.
Star Expansion Bolt Mfg. Corp.
Steiner Sales Co.
E. A. Stevenson Co.
Stratoflex Co.
Swivelier Co., Inc.
Sylvania Electric Products, Inc.

T

Tapecoat Co.
Templeton, Kenly & Co.
G. H. Tennant Co.
Thomas Flexible Coupling Co.
Thread-Ezy Manufacturing Co.
Tilden Tool Manufacturing Co.
The Toledo Pipe Threading Machine Co.
Turco Products, Inc.

U

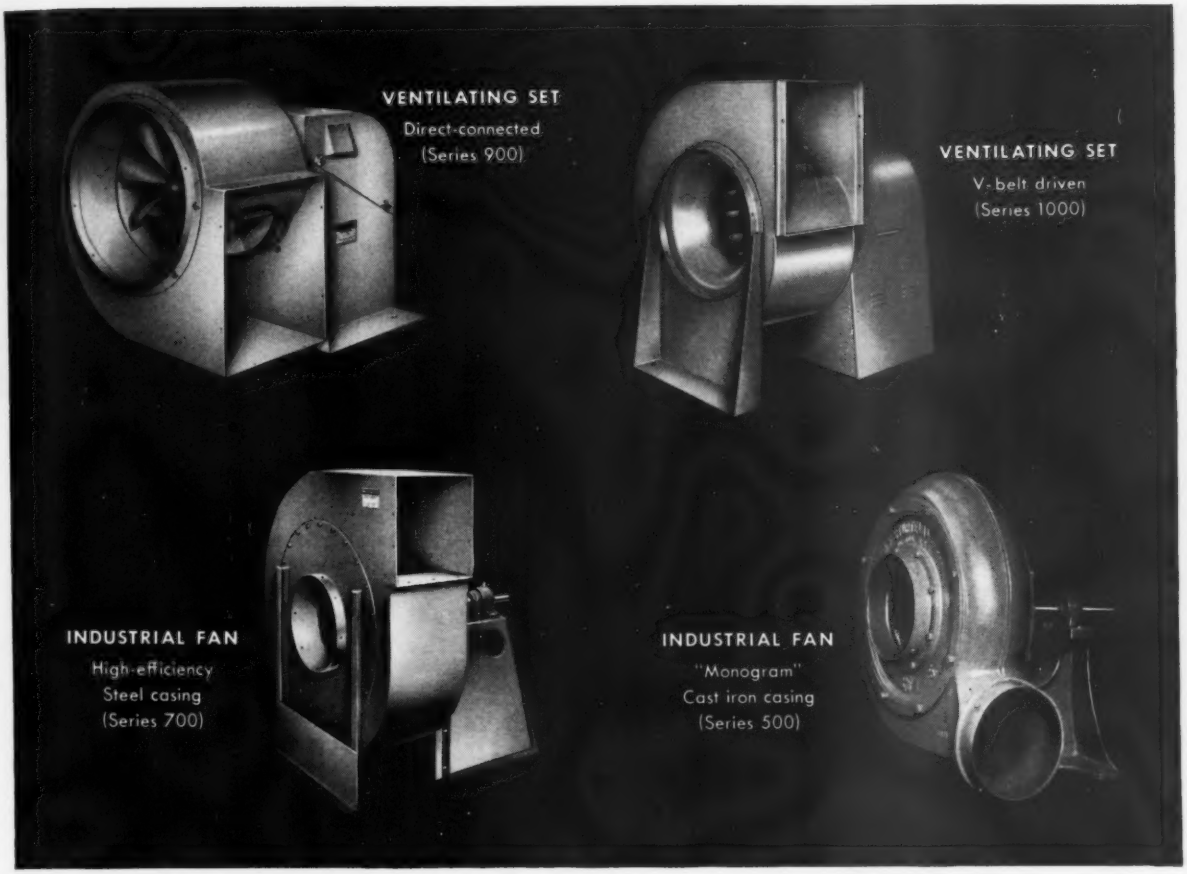
Union Wire Rope Corp.
Unistrut Products Co.
U. S. Hoffman Machinery Corp.
Air Appliance Div.
Filtration Div.
Up-Right Scaffolds, Div. of Up-Right, Inc.

V

Vacu-Blast Co., Inc.
Valvair Co.
Viking Pump Co.

W

Wallmaster Products, Inc.
Warren & Bailey Co.
The Weatherhead Co.
West Disinfecting Co.
Western Gear Works
Western Industry
Western Lithograph Co.
Western Products Div.
Westinghouse Electric Corp.
W. T. Wills Machinery Co.
Wilshire Power Sweeper Co.



These Westinghouse Fans Help You Increase Production . . . Employee Efficiency

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (SERIES 700) . . . for dust collecting and conveying at high pressure. Wide range of capacities. Three types of wheels in 11 sizes.

1. Air Handling Wheel . . . particularly adaptable for general air handling and exhaust systems in removal of smoke, fumes and gases.

2. Material Handling Wheel . . . designed specifically for grinding and buffing wheel systems, and conveying materials such as chips, sawdust and grains.

3. Long Shaving Wheel . . . handles long fibrous materials that pass through the fan itself: trimmings from corrugated boxes, alfalfa, long shavings from woodworking machinery, rags, others.

INDUSTRIAL FANS (SERIES 500—MONOGRAM) . . . ruggedly built, with cast iron casing. For use as a blower or exhaust or for dust control, collecting and conveying waste or raw materials, supplying air for furnace blast, drying, etc. Provides long, trouble-free service at low cost under severest operating conditions. In 10 sizes with wide range of capacity.

SERIES 900 VENTILATING SETS . . . compact, efficient, direct-connected and ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel design minimizes problem of handling airborne dirt and grease. Six sizes from 6" to 15" wheel diameters.

SERIES 1000 VENTILATING SETS . . . V-belt driven, self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes from 9" to 30" wheel diameters.

PROMPT SHIPMENT . . . these fans are available for immediate shipment from our Pacific Coast Plant—Berkeley, California.

These rugged, powerful Westinghouse fans provide the most economical solution to your specific air handling problem. Get the facts from your nearest Westinghouse-Sturtevant office.

Sturtevant Division offices at: **Los Angeles, San Francisco, California—Portland, Oregon, and Seattle, Washington—Pacific Coast Plant: Berkeley, California.**

WESTINGHOUSE AIR HANDLING

I-80380

YOU CAN BE SURE...IF IT'S Westinghouse

AUTOMATIC DOORS
cut maintenance costs

ONCE looked upon as a luxury, doors that automatically open, stay open for a predetermined interval, and close after traffic has cleared, are now considered by more and more Western plant managers as a means for cutting expenses.

By eliminating the practice of butting open conventional doors with industrial trucks, expensive repair bills to the trucks and doors are eliminated. Industrial doors that swing, slide, and fold, equipped with operators and controls that automatically cause them to open before the truck enters the passageway, are doing away with this large and unnecessary item of maintenance expense.

PULL CORDS actuate these automatic doors at James Allen and Sons. Safety ray, enclosed in cylinder at right of door, holds doors open until passageway is clear, then closes.

Maintenance men are also quick to realize that automatic doors greatly reduce damage to material in transit between departments and save time and effort.

At James Allen and Sons of San Francisco, door maintenance expense has been kept to a minimum and plant productivity and speed of traffic increased. Stanley Magic Door Operators cause the doors to swing open when actuated by pull cords, well before the hand truck shown in the picture approaches the passageway.

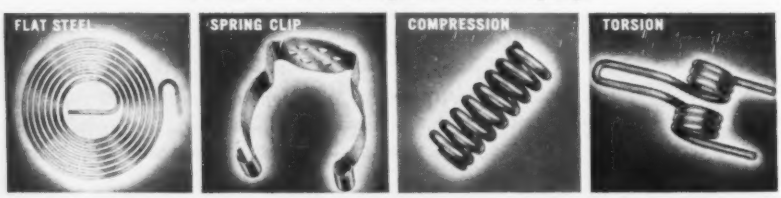
The doors are held open by the diagonal safety ray located to the right of the door. While this ray, which crosses diagonally from one side of the passageway to the other, parallel to the floor, is interrupted, the doors will remain open. When the truck has cleared the passage and the diagonal ray, the doors will close automatically and quickly.

One manufacturer of heavy equipment uses another combination of pull cords and photoelectric cells to control an airlock between buildings. The controls are situated so that only one set of doors can be open at a time, creating the airlock, and maintenance and operating costs are kept to a minimum because the doors open automatically.

A mill which tried out four automatic door controls now has 14 in use. Sliding doors controlled by pull cords have greatly cut down draft conditions and have helped to keep conditioned air, humidity, and temperature at desired levels.

The right curves... Beautiful dames, baseball games —and spring users. They all need the right curves in the right places. That's why western industry has been turning to California for springs in all types, sizes, wires and curves since '23. Left-hand coils. Right-hand coils. Cold rolled or hot coiled. We have 'em for you, as close as your phone.

We Stock the West's Largest Selection of Springs



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KEEPING CENTRIFUGAL PUMPS RUNNING . . .

Good attention and planning will reduce shutdown time to a minimum

By
FRED A. CARPENTER
President
Berkeley Pump Company
Berkeley, Calif.

IN any plant that uses a pump, or a number of pumps, to handle liquids in the process of manufacturing, a survey should be made to determine just what would happen to the plant should a pump, or the motor that runs it, fail to operate. Too often it is taken for granted that the pump will not fail. When it does, it usually involves serious stoppage of work all along the line.

A survey should disclose just what the loss in production would be when a pump stops. If it is a minor process that does not materially upset the plant operations, a little more thought to the pump may need be given, but often it will be found that the loss caused by stoppage of a strategic pump will exceed the cost of the pump and its prime mover many times over. In cases of this kind it should be estimated how long it will take to repair the pump or put a replacement into action while the faulty pump is being repaired.

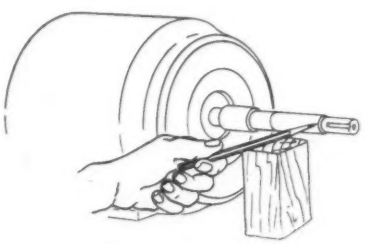
In some extreme cases it may be found necessary to have a duplicate pump piped into the system in such a way that it can be put into action in a matter of seconds by merely opening and closing valves, and turning on a switch.

Wear detection

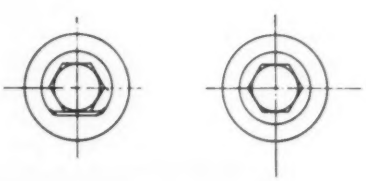
In most industrial layouts the pump is delivering liquids into a closed system, where it is difficult, if not impossible, to see the actual stream being discharged from the pump. In these cases the best detection device is the common pressure gauge. When the pump is new and known to be in first class condition, the friction in the pipe line, plus the elevation, if any, involved, will show on the pressure gauge. This operating pressure should be marked down for future reference.

After a passage of time a decrease in pressure will indicate that the pump is not delivering as much liquid as when first installed. Normally this pressure drop would be quite gradual and the corresponding drop in volume may, or may not, have a critical effect on the pumping process. For example, if the pump operates a cooling tower, the cooling tower will gradually reduce its cooling ability as a lesser volume of water is circulated.

There is another condition that can occur where the pressure gauge will tell another story. If the pressure, instead of falling off, goes up beyond its original point, it indicates just one thing: that friction in the pipe line is increasing by virtue of accumulation of scale and other material that roughens up the inner surface of the pipe and restricts flow of the liquid. If this restricted flow has serious consequences on plant operations, careful planning is necessary. The two alternatives are: put a higher pressure pump in the line, or find some means of cleaning out the pipes.



TRUEING UP with a pencil. If pencil mark does not show all the way around, true up shaft by striking with a lead or wooden hammer at the high point where the pencil mark shows. Recheck with pencil until mark shows all the way around.



Performance curve

If a plant engineer wants to be really scientific, he should ask for a performance curve on each pump that handles a critical operation. Then, with the vacuum gauge on the suction and the pressure gauge on the discharge, he can convert the vacuum into feet (1 in. equals 1.13 ft.) and the pounds pressure into head (1 lb. pressure equals 2.31 ft.).

The addition of these two gauge readings converted into feet will tell him what point of the performance curve or chart the pump is operated under. It is not necessary that the pump perform exactly as per the manufacturer's performance curve, but the variation will follow the curve line very closely.

When it is known how much drop-off in capacity can be tolerated due to wear, time for pump overhaul becomes apparent. Naturally it should be done at the most convenient time

of the plant's operation. It is far better to anticipate a repair job than to wait until an actual breakdown occurs.

Stuffing box critical

Of all types of pumps used in industrial plants the centrifugal is undoubtedly the most simple, but all pumps must have the drive shaft extended out of the pump housing and the liquid sealed within the pump housing by means of a stuffing box or other sealing device. When the shaft is smooth and rotating on a true axis, ordinary stuffing box packing will provide a very effective seal, even under relatively high pressures.

When wear occurs either directly on the shaft, or when unbalance of the rotating impeller occurs, the shaft ceases to operate under a true axis and the stuffing box packing has a difficult job to perform. When it is difficult to make the stuffing box hold, it is a sign that pump overhaul cannot be long delayed. To be sure, some forms of stuffing box packing will be found to be more suitable than others, but no packing will hold very long on a rough shaft.

Some industrial centrifugal pumps are equipped with a lantern gland located approximately midway in the stuffing box. With this type of pump the impeller is hydraulically balanced so that the stuffing box is subject to the pressure or vacuum of the incoming liquid. A small line from the high pressure side of the pump is connected to the stuffing box so as to flood the space in which the lantern gland is located.

Usually there is a valve to regulate the flow of this high pressure liquid to the lantern gland. If this valve is shut off, and the pump operates under vacuum, it is liable to take in air through the stuffing box. Therefore, the valve should be open just enough to cause a slight leak at the stuffing box.

When repacking a stuffing box that uses a lantern gland, care should be exercised to see that the lantern gland is located opposite the opening connected to the small pipe line. Otherwise the lantern gland will be pushed clear past this opening so that the liquid seal will have no effect. When repacking a pump, all the old packing should be removed, not just the packing between the lantern gland and the outside.

Trueing up a shaft

When a stuffing box leaks excessively a short time after repacking, the pump should be shut down and the shaft checked at the earliest opportunity. With most of the pumps found in industry, the pump will be built right onto the motor and the motor shaft will extend into the pump housing or a stub shaft will be employed for this purpose.

With the pump removed it is an easy matter to operate the motor, and with use of a lead pencil the shaft can be checked for trueness. Minor roughness on a shaft can be corrected by merely running the motor and filing the shaft where it passes through the stuffing box. Before filing the shaft should be trued up by use of a lead hammer until it rotates on a true center.

If the shaft is deeply grooved it will require replacement. Before reassembly of the pump the impeller should be balanced on a mandrel so that it will not put a whip in the shaft.

Pumping liquids

Most commercial centrifugal pumps are designed to pump water, which is a relatively stable liquid. When salt is added the water becomes brine and has an increase in specific gravity. That is, it becomes heavier. The heavier the liquid the more power required, and it may be figured in direct proportion to the change in specific gravity. Salt water, or brine, is corrosive.

Pumps used should either be all iron or all bronze. Operating the two metals together will cause electrolysis which will result in rapid deterioration of the pump casing and impeller. In an emergency a pump made of both materials can be used, but it should be recognized that the pump's life will be relatively short under these conditions.

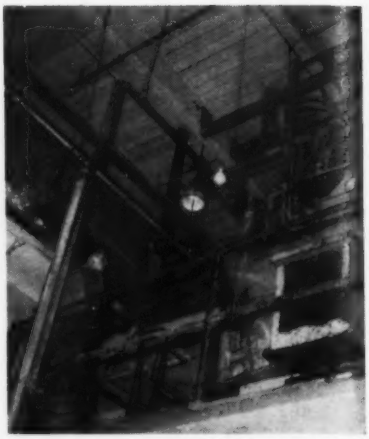
A pump that will do a fine job handling water might not work at all well on a liquid that has a higher viscosity than water. However, when specifying the pump for liquid other than water, obtain all the facts on the liquid, such as the specific gravity, viscosity, and the corrosive factors.

It is recognized that maintenance men have things to do besides looking after pumps, but perhaps the foregoing remarks will give plant superintendents and maintenance men a few tips that will prevent plant breakdown at critical moments.

TRUCKS ON TOP

TRUCK companies received 81.3% of all revenue for hauling freight and express within the state of California in 1953, the California Public Utilities Commission reports.

STEAM CLEANER does it better, faster



CARBON BLACK, rubber dust, and other impurities efficiently removed from rubber mills, Banbury mixers, trucks, etc., at Oliver Tire by this Maisbary fireless steam cleaner.

BY SUBSTITUTING a steam cleaner for hand work with scrub brush, kerosene, and thinner, cleaning time at Oliver Tire & Rubber Co., Emeryville, Calif., was cut down 75%.

Steam cleaning, which utilizes live steam from existing steam lines to get cleaning pressures and heat, also reduces fire hazard by removing inflammable grease and oils from floors and machinery.

MEASURING ANGLE on Dodge prop

TINY DEVIATIONS in the airfoil angle of an aircraft propeller blade are detected with this electrical device in the Dodge San Leandro plant of Chrysler Corp. When assembled into a four-bladed propeller, this blade is matched with the others so that deviations are canceled. The Dodge plant is now in production on the propellers for Navy and Air Force planes.

MAINTENANCE – What is it? Who does it?

(Concluding part of article which begins on page 39)

maintenance staff is necessary, one must be able to obtain the following information:

1. Amount of down-time due to breakdown or inability of the equipment to maintain its standards or tolerances on the work. Is the equipment overloaded? Is it adequate for the job being done?
2. Could a breakdown have been prevented by a planned inspection procedure?
3. Were there enough parts in stock to make repairs without delay? How much time was lost waiting for crucial parts?
4. Sufficient data to analyze weak spots.
5. Has the equipment been properly selected for the work it is doing?
6. Were proper and sufficient specifications written into the purchase order so that the manufacturer could supply equipment of proper size and type?
7. Is the equipment located properly so that maintenance is easy? Is there room to work and are handling facilities adequate?
8. Has breakdown occurred due to carelessness on the part of the operator?

How should plant maintenance personnel be increased to meet automation of machinery?

With the increase in automation, more manhours are required for preventive maintenance work. Again, an engineer must call upon his records to show which types of equipment require the most attention. Special training of personnel for maintenance must also be considered with the increase in complexity of controlling devices. There is practically no way of determining the exact increase in personnel that will be required with an increase in automation. Past experience, possibly coming from the manufacturer or from other plants using the apparatus, will show what was needed for the same or similar machinery, and this can be used as a guide in the redesign of the maintenance program.

Adequate records will show the backlog of work and will quickly indicate whether increased maintenance personnel are needed. It has been found that if a lot of machinery is introduced into productive operation at one time, more personnel will be required for a period of a few months to one or two years than will be required after adequate mechanic training has been instituted and personnel have become familiar with the new equipment.

Here again records of simplicity but completeness must be kept to show quickly whether the staff is over or under manned. Adequate records are really the key to determine just what is required in the way of increased maintenance due to automation. Job estimates of past work and future ideas should be kept on file, and all records and plans must be sufficiently thorough and complete to withstand the scrutiny and challenge of management at all times.

Automation of machinery by its nature implies close coordination among the various parts of the process. If a piece of machinery fails to operate, the entire process is affected. It is imperative that maintenance be kept abreast of new equipment. This might mean additional personnel, or it could mean the same number with increased development of technical skills. One rule of thumb is that plant maintenance personnel should be increased on an average by one man for each ten direct labor men eliminated by automation. Common sense tells us that maintenance personnel should be increased in direct proportion to the increase in equipment complexity whether this requires addition of a single man or doubling the maintenance force.

How does good plant maintenance contribute to a better product?

By assuring uninterrupted operation of all facilities, and through this continual peak performance, a better quality product. Needless to say, every dollar saved by minimizing machine breakdown is a dollar saved in the cost of the finished product.

Another area that deserves some consideration is employee morale. When breakdowns occur, employees are likely to become sour. They blame the boss or the management for being too cheap to properly maintain the equipment and no one likes to work for a cheap outfit. So, general morale decreases, and with it goes quality of product.

How should requests for services be handled?

It is generally agreed that there is no one way to handle requests for services. However, in order to minimize confusion, work requests should be written and handled through the proper channels. In a small plant, the request might go direct to the machine shop foreman with a copy to the plant engineer or plant superintendent. In larger plants, it might funnel through the plant engineer's office on its way to the plant maintenance department. This latter plan offers the plant engineer a chance to make decisions on necessary replacement of equipment, major overhauls, etc.

Simplicity of paper work must again be emphasized, and work should be scheduled so that it does not interfere with the preventive maintenance program. Requests for services may be handled through maintenance's dispatcher, who is a representative of the plant engineer. On new construction the plant engineer may handle all preliminary drawings and estimates and then turn the problem over to specialists.

For routine, repetitive maintenance, blanket work orders should be set up on an annual basis. Verbal requests from supervision of an area are then all that is required.

For non-repetitive work on smaller jobs, however, one firm uses a simple request known as a patrol order, issued by an area foreman directly to the maintenance department. It can be used for from $5 to $15 expenditures on material and two to four hours of labor. Jobs requiring more time and money are requested on a formal work order which requires approval by the area supervisor and plant management.

Another plant manager says, "On trouble calls, any responsible person is authorized to call the trouble desk. On calls other than emergency, we allow penciled notes, formal requests, or any means of notification so long as it reaches the dispatching center. We are concerned with giving service and the more informal and direct the request, the better."

(CONTINUED ON PAGE 84)

MAINTENANCE

. . . Begins on page 39

In another plant, the best arrangement seems to make a distinction between pure maintenance and alterations and new construction. Maintenance is handled, insofar as is possible, by scheduling and with the minimum number of requests. That is, the leaderman or foreman responsible for maintenance should automatically take care of any minor problem that comes to his attention.

For alterations or new work, the usual procedure is for the department head to issue a request via the department foreman. Requests are investigated by plant engineering and, if endorsed, the necessary job orders, requisitions, specifications, etc., are prepared by plant engineering and forwarded to the manufacturing executive for approval.

How much engineering is required in the maintenance function in today's plant?

The consensus of opinion seems to indicate that roughly 10 to 15% of the maintenance department's time is spent in actual engineering. The only time any great amount of engineering is required is if a new department is to be set up, a new product comes into the line of manufactured products, or an existing department is modernized. At that time, engineering is liable to jump to more than 50% of the maintenance department's time.

In another sense, an engineering background and engineering experience are used in almost every decision made by plant engineering and plant maintenance.

Plant engineers generally do only the preliminary work in engineering, usually due to a lack of time. Assistants, suppliers, and fabricators must often handle a good part of the engineering on their particular specialties. It is impossible for the plant engineer to be a specialist in all branches of engineering, and often occasional guidance is all that is required of him.

What determines the dividing line between maintenance and repairs, and new construction? What is the difference between a maintenance supervisor and a plant engineer, and how much should the latter become involved in maintenance?

There is no sure-fire means of determining when to quit patching and start replacing. One plant engineer says maintenance should stop and replacement begin when annual depreciation cost equals cost of maintenance. However, another maintains that replacement should not be considered until annual maintenance is considerably higher than depreciation and obsolescence rate.

Individual circumstances largely control the decision and no sharp line can be drawn. New construction plans are usually determined in conference when all angles have been considered, including the availability of funds.

One plant engineer indicates that the dividing line between maintenance and repairs and new construction is determined by the accounting department. Maintenance and repairs are expensed, that is, they are charged against the annual operating budget. New construction, on the other hand, is capitalized. The total value of new construction is set up as an asset and the value of the asset is depreciated over a period of years according to accounting practice.

Organizational trends seem to indicate that the status of the plant engineer is becoming comparable to

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2 THE CONTAINER MUST ASSEMBLE AND CLOSE IN LITERALLY SECONDS—MUST KEEP LABOR COST DOWN.
3 IT MUST STACK SAFELY, STURDILY—SAVE BOTH TIME AND SPACE.
4 IT MUST ABSORB SHOCK—NOT TRANSMIT SHOCK TO THE PRODUCT.
5 ITS LIGHT WEIGHT MUST REDUCE TARE WEIGHT, REDUCE FREIGHT BILLS.
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that of the superintendent of production, laboratory, etc. These report directly to the assistant plant manager or plant manager. One or more maintenance supervisors will report directly to the plant engineer, who is responsible to his superiors for the entirety of maintenance function.

In smaller plants, the plant engineer may be the maintenance supervisor, but he is usually engaged in the planning and analyzing of problems of new equipment, layouts, new services, and selection or design of new machinery rather than handling regularly scheduled operations. Estimates of the amount of time the plant engineer spends in maintenance range from 10 to 100%, but his main job in this respect is that of supervising and handling long-range planning and emergencies.

A well-run plant will have all routine maintenance set up under blanket work orders, to be handled by trained mechanics and foremen who, in turn, report to the maintenance supervisor. While the maintenance supervisor is primarily concerned with directing the activities of the maintenance craftsmen under his supervision, the plant engineer is concerned with planning and controlling maintenance on the larger projects as well as coordinating plant engineering with the operation of other departments in the plant.

What are the duties, qualifications, range of responsibility, and contributions to quality of product of a plant engineer?

Duties and responsibilities of a plant engineer cover practically everything from soup to nuts. The plant engineer is the manager of the plant engineering department, and as such is responsible for the administration of the department as well as the technical aspects of plant engineering. He is considered to be a member of the management team and reports to the plant manager or other top management directly.

Essentially he is responsible for the maintenance of all plant machines and equipment, inspection for safety of all plant equipment, lubrication of equipment, installation of equipment, building and grounds maintenance, utility generation and distribution, and the repair of any unavoidable breakdowns in production with the minimum loss in production. He is also responsible for following company rules, city, state, and national codes, in planning any new installation, and making sure that an adequate budget is established for carry-

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This method of packaging eliminated the use of 150 individual containers, and the materials needed to pack and seal them. Units were handled *once*—at the assembly line, where they were placed on the trays. Strapped to the pallet base, which also served as a tray, the trays became a single, pilfer-proof unit, easily handled by *one* man and a fork truck!

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. . . Begins on page 39

ing out plant engineering functions.

The plant engineer's responsibility begins where management specifically instructs or implies it to begin, and has no particular end. He is in contact with all plant groups, such as buying, production, laboratory, accounting, warehousing, not only in connection with repair work but also installation of new facilities, purchases, and shipments involved in plant operation and growth.

As to the qualifications of a plant engineer, he should have the patience of Job, the tact of a diplomat, the finesse of a politician, and a near genius for the unusual that continually crops into view. He should be a graduate mechanical, civil, or electrical engineer with five years experience in plant maintenance, or as an equivalent, ten years experience as a supervisor in plant maintenance, to qualify himself.

A plant engineer should, somewhere along his training in a plant, have had charge of a production department so he can realize the extent of the problems that have to be solved by production. This seems to make for closer cooperation during maintenance troubles. A plant engineer should have considerable practical experience in construction of equipment and use of materials in his given field and should be thoroughly familiar with the design and performance of equipment used in his work.

Since plant engineering is what makes the wheels go around to make the product, a good plant engineering group will be continually on the alert to devise better machines and improve materials handling, both of which have a distinct bearing on quality control. Another plant engineer indicates, "The better the facilities and surroundings, the better class of employees that can be hired, and the result is, or should be, a better product."

Plant engineering contributes to a better product by reducing breakdowns and assuring uniform and uninterrupted utility service. Clean-up, one of the functions of plant engineering, can contribute to a better product by reducing the amount of contamination in the product. Proper coordination of the plant engineering operations with regard to new facility installations should result in a better quality product while the new facilities are being installed.

How does the plant engineer promote safe working conditions and contribute to smoother operation of his plant?

It is generally conceded that the plant engineer is responsible for safety in any designs that may be adopted. He is responsible for safety of contractors' personnel as well as plant personnel during all periods of construction. It is his job to maintain grounds, walks, and roads in a safe condition and to see that all purchased equipment is satisfactory.

He must promote safe working conditions by insisting that his foremen follow company, state and national safety regulations. By reviewing each accident report involving plant engineering personnel, he will have a better chance of eliminating any future cause of accidents. In plants having a safety engineer, plant engineering should cooperate to the point of making sure that electrical equipment is grounded, adequate guards and safety devices are satisfactorily installed, etc.

The plant engineer carries prob-

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How we opened the door to lower costs for Ford

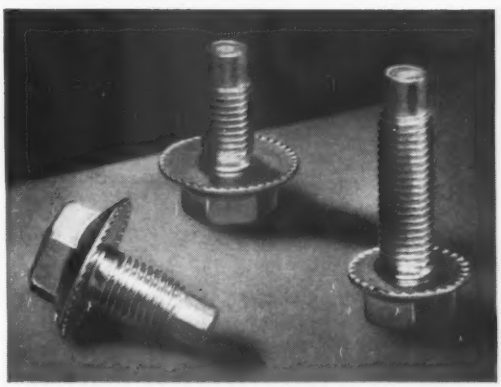
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.



FASTER ASSEMBLY, reduced costs were the pay-off, using RB&W designed wide-flange SPIN-LOCK screws (left) for door hinge. Other SPIN-LOCKS (right) hold hinge on door. SPIN-LOCK screws *can't loosen* because ratchet-like teeth lock into surface and hold tight.

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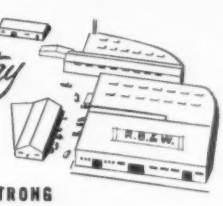

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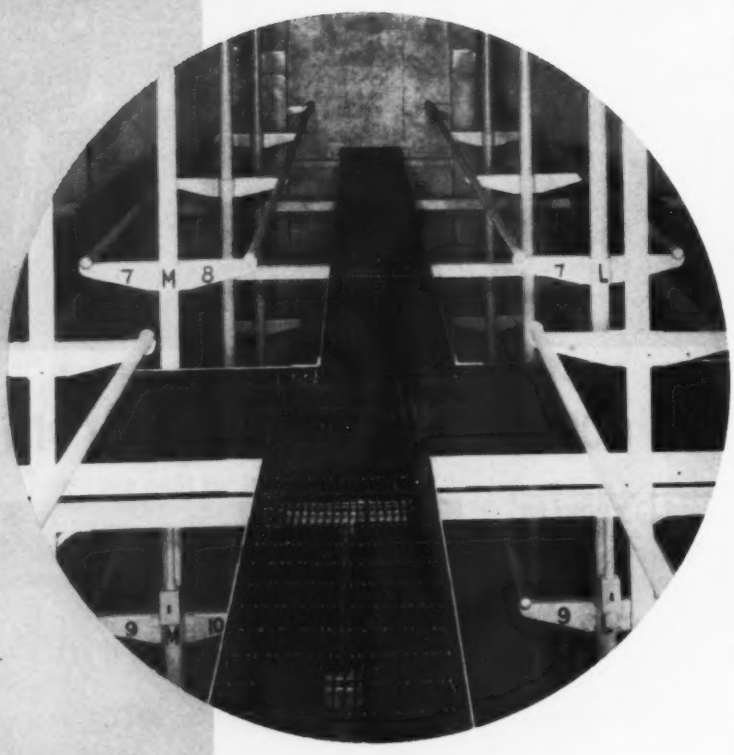

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ably the largest load for safety of anyone in the plant and should be constantly aware of operating conditions which might involve hazards.

By tactfully making suggestions to other areas as to how improved operations can be obtained and working conditions improved, and by planning for future operations rather than just concentrating on immediate needs, the plant engineer makes his contribution to smoother and better operation of the plant. His greatest assets are cooperation and good will, and although he produces nothing he backs the team that does produce. As one plant engineer put it, "My own policy, and the one I try to instill in all of my subordinates, is that it is our duty to do everything possible to make the job of the production worker easier.

An individual engineer can contribute to a better and smoother operating plant by suggesting newer and better ways of carrying out operations while at the same time training his organization towards preventive maintenance. He must keep his crew flexible enough to handle emergencies, knowing that breakdowns always occur when least expected. His organization should be large enough to handle these emergencies without robbing himself of men who are doing preventive maintenance. These factors, plus a good storeroom of parts and records, and a smooth working relationship with the purchasing department, will do much to run a plant smoothly.

What qualifications does the plant engineer develop on the job that might warrant his promotion to plant manager or other position?

Needless to say, the vast amount of knowledge stored by a plant engineer is as necessary and important to management as it is to the proper functioning of his job. His background in engineering, human relations, and plant production problems place him in the position of knowing which plant operations can be profitable and which can be unprofitable. His practical know-how, his ability to work with both management and workmen, and a proven capability in a wide range of activities may often put him in position for promotion.

Resume Reading on Page 44

WORK CONTROL THAT WORKS

THREE steps in maintenance on this machine.

WRITE CLEARLY — REPORT ACCURATELY

REPAIR WORK ORDER

№ 257935

MACHINE OR EQUIPMENT TYPE: Milling Machine — PROPERTY NUMBER: DPC-1405

LOCATION: Fresno — Bldg. 287 — Room 1st — Column 67

TROUBLE OR INSTRUCTIONS: Needs New Belt

REPORT: JOB ASSIGNED TO: H. Douglass — CLOCK NO. 41-1 — TIME 2:40 PM

WORK PERFORMED: Replaced Belt

MATERIAL USED: (EXTRA SPACE ON BACK) OR ATTACH FORM 11-V: 1 Belt 47" B61

ACCOUNT NO. 9111-67

COMPLETION TIME: 3:15 PM — MAN HOURS EXP. 1½ hr. — TOTAL DOWN TIME 1½ hr.

A Recurrence Can Be Prevented By: BETTER INSPECTION ____ REDESIGN ____ BETTER SERVICING ____ OTHER ✓ (EXPLAIN ON BACK)

COMPLETED — SUPERVISION H. C. Douglass — DATE 4-22-54

MAINT. DEPT. WORK COPY

ELECTRICAL · DIAGNOSIS (MACHINES) · MECHANICAL ✓ · PROCESS DESIGN · HYDRAULIC · PLUMBING PIPING · HEAT & VENT. · AIR COND. REFRIG. · BUILDING & YARDS · BUILDING EQUIP. · SHEET METAL · CARPENTERS · PAINTERS · LACQUERS JANITORS · OILERS · AUTO

ABOVE: When machine operator informs his supervisor of need for new belt, Maintenance is notified and this form filled out.

IMPORTANT
SEE ORDERING AIDS ON BACK OF THIRD COPY
NON-PRODUCTIVE MATERIAL REQUISITION

CHARGE TO	✓	EMPLOYEE	CLOCK NO.
CARD		H. Douglass	41-1
DEPT.	✓	DEPT. 41 — LOCATION & PLANT Fresno	DATE 4-22-54
REPLACE		ACCOUNT # EQUIP. # SERIAL # R46 29016	

QUAN.	UNIT	DESCRIPTION	DO NOT USE	
1	ea	Veg Belt 4x61	ea	4.80

AUTHORIZED SIGNATURE: M. Cranston Foreman (MUST BE ACTUALLY SIGNED BY AUTHORIZED PERSON ONLY)
FILLED BY C. Funk — DATE 4-22-54
REQUISITIONER'S COPY

LEFT: Maintenance mechanic receives above form and then fills out this requisition shown at left to get belt from stock crib.

MAINTENANCE WORK ORDER

№ 85094

DISTRIBUTION: DEPT. · DEPT. · DEPT. · DEPT. · ACCT. · FILE

DATE 4-22-54 — REQUEST BY W. C. Hatfield
DUE DATE 4-23-54 — PREPARED BY Hazel Fuchs
DEPT. 41-Fresno — APPROVED BY M. Cranston

SPECIFICATIONS — WORK COPY

Build up and turn shaft and replace bearings as required on Milling Machine DPC#1405 located in Building 287, Department 67.

DEPT.	HOURS AUTH.	ACCT. NO.	HOURS EXPENDED	REMARKS
41	1½	9111-41	1½	Work completed 4-23-54

BELOW: If further maintenance work on the vertical milling machine is required, then this form comes into use.

TO illustrate graphically the effectiveness of work control procedures at the Fresno operations of North American Aviation, Inc., let us take as an example a vertical milling machine on which a belt has been broken and follow it through the repair operation.

The machine operator immediately reports the problem to his leadman or assistant foreman, who in turn calls the plant maintenance department. A clerk at the control desk picks up a Repair Work Order form (RWO) and fills in such specific information as: requested by; department number and telephone number; machinery or equipment type property number; floor; column number; nature of trouble or any special instructions, etc.

After entering her own name along with the time and date of the call, the clerk checks off the mechanical section on the right-hand side of the card. She then tears off the third or follow-up copy, places it in the RWO in-work file, and notifies the leadman in charge of this activity.

Next step

The leadman picks up the RWO and assigns it to a maintenance mechanic, indicating his name, clock number, and the time. The mechanic studies the form and, determining that a new belt is required, withdraws one from the stock crib on a non-productive material requisition, Form 11V. After entering the account number on the 11V, the stock crib attendant returns the copy of the form, along with the belt, to the mechanic.

When the mechanic has placed the belt on a milling machine and tested it as to proper operation, he notifies the leadman or operator and enters the time on the RWO.

While the mechanic is installing the new belt, he further examines the

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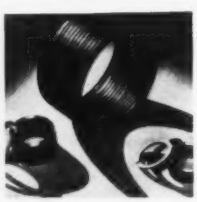

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machine to determine whether or not a recurrence of the problem can be prevented. If he finds an unsatisfactory condition, he so indicates at the bottom of the RWO and returns this, together with his copy of the 11V, to his leadman, who enters the account number, the manhours expended, and the total machine down-time.

The assistant foreman, after reviewing the form, signs his name, dates it, and returns it to the clerk at the control desk. She enters the time spent by the mechanic and the cost of the belt on the back of the plant maintenance department copy and destroys the follow-up copy. The RWO form is split, the original copy being forwarded to the foreman and general foreman for review and then filed in the completed file. The other copy of the RWO is forwarded to the department head of the department in which the work was performed.

Additional work

If the mechanic believed that a recurrence of the broken belt could be prevented by replacement of worn pulleys, or some other reason, he would notify the assistant foreman, who in turn would immediately inspect the machine. If this further inspection bore out the mechanic's observation, the assistant foreman would prepare and issue a Maintenance Work Order (MWO).

Using this order, the mechanical section would schedule and accomplish the repairs, eliminating excessive cost of belt replacement.

Why it works

In order to understand the need for a plant maintenance work control procedure that really works, we should examine some of the thinking behind North American's program. Costs, charged to overhead, must be kept at a minimum, yet, in the manufacture or modification of aircraft, certain types of equipment must be maintained in such condition as to pass periodic certification tests, as necessitated by contractual obligations with the U. S. Air Force.

There is a level in maintenance expenditures that management must judge as economically sound, and this must include any extensive housekeeping policy and the establishment of preventive maintenance programs, in addition to the normal aspect of maintenance operations. Efficiency in maintenance operations is also important, and in this regard the use of standard maintenance operating procedures is considered one

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After a survey, P. G. and E. lighting engineers recommended a translucent table with lamps beneath a glass panel, as shown above. Now the preserves and jellies are clearly silhouetted against a luminous background. Result: one inspector easily does the work of several. Cost: only $100... for materials. The lighting survey was free.

Your business may be entirely different from Tea Garden's. But chances are, a correct seeing environment can also help raise the output and the quality of the work of your employees. It costs you nothing to find out. So let a P. G. and E. lighting engineer make a survey for you soon.

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4140

Investment casting by Bone saved 63% on this part!

Specifications were high on this link made of 4140 alloy steel, and called for critical inspection. Originally it was machined from a forging ... but at a cost of $15.21.

By changing to the Bone investment casting shown here an overall saving of $9.71 was made. The part also was smoother, non-porous and dimensionally uniform. Total cost, including all machining, was $5.50.

With its modern equipment and staff of engineers, metallurgists and craftsmen here in the west, Bone now precision casts non-ferrous alloys, low carbon and alloy steels, corrosion and heat resistant metals—all to micrometer tolerances. In addition, it has facilities for tool making and machining.

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of the best methods to reduce confusion and waste of time.

North American's plant maintenance work control procedures are prepared and controlled by plant engineering at the main plant in Los Angeles and are distributed to the various company facilities located elsewhere. Plant maintenance is responsible for two separate but related functions:

1. Direct and perform all plant and equipment maintenance and repair functions, including replacements required to insure operation of all company owned or controlled facilities and equipment, in accordance with city, county, state, or federal codes, as well as safety, insurance, and other company accepted standards of sound practices.

2. Furnish labor, equipment, and material for normal new construction, construction improvements, or rearrangements of company owned or controlled facilities, as authorized by Job Orders and Transfer or Disposal Authorizations.

Project type work requirements, larger than the normal scope of work handled by the maintenance department, are contracted with local contractors. Planning and coordinating such activities is handled by the industrial engineering department, leaving the number of plant maintenance department personnel relatively constant during construction and rearrangement peak work loads. As a result of this policy, maintenance personnel consists of well experienced, competent, and full time employees.

Forms

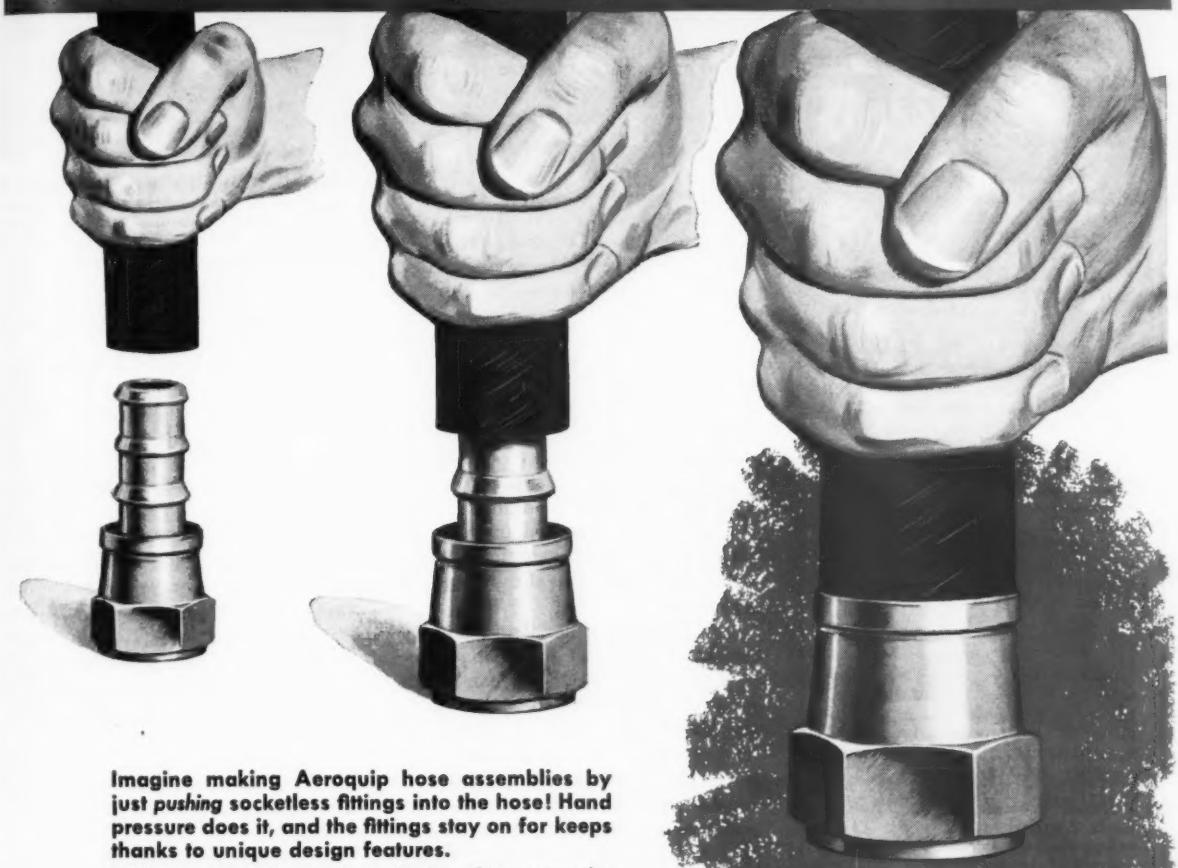
The Repair Work Order, as indicated in the example, serves to authorize labor to be performed and material to be used to make necessary repairs to machinery, equipment, and other physical properties for which the maintenance department is responsible. It is limited to work initiated from a trouble call, which may be reported verbally, by telephone, or in writing.

Authorization for work in this form is limited to four manhours without approval. If it is determined that the time required will exceed four manhours or will require continuation on another shift, the responsible foreman may approve the extension of this work to 100 hours. The general foreman's approval is required for work exceeding 100 manhours.

When it is necessary to extend the work beyond the four-hour limit, the

NEW AEROQUIP SOCKETLESS FITTINGS

make hose line replacement amazingly easy . . . amazingly quick!



Imagine making Aeroquip hose assemblies by just *pushing* socketless fittings into the hose! Hand pressure does it, and the fittings stay on for keeps thanks to unique design features.

With no socket, Aeroquip socketless fittings are the last word in one-piece simplicity. They are specifically designed to work with Aeroquip 1525 triple-ply, cotton-reinforced hose.

A small inventory of bulk stock makes fuel, air, water, and oil lines using medium pressures. There is no waste or dead inventory. Sizes available are ¼, ⅜, ½, and ⅝". For more information call your Aeroquip distributor or write us direct.

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. . . They'll Stay On!

Make socketless hose assemblies yourself in the Aeroquip booth, No. 553, at the Western Plant Maintenance Show, July 13-15, Los Angeles.

Aeroquip

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responsible foreman stamps all three copies and initials and dates them in the proper place. If the work called for on the extended RWO should be entered on the maintenance cost record cards, the foreman adds the letter "P" to the serial number of each copy, forwarding the yellow copy to the work control section.

Upon completion of the job, the white and pink copies are forwarded to the work control section for entering the cost on the maintenance cost record card. The workman's time expended is reported on the leadman's daily report for each shift, which accurately lists the correct SWO and RWO numbers. Where work performed is chargeable to a contract account as authorized by a job order, the daily work report lists the job order number and the RWO number.

Maintenance work order

This form is designed to provide uniform procedure for reporting and charging maintenance and repair work. It is used to authorize labor performed and material used by the maintenance department for routine, scheduled, and operating types of maintenance.

A department other than the maintenance department requesting maintenance service, other than emergency repairs, forwards a request for an MWO with written approval of its foreman to the work control section. The work control section forwards the request to the responsible maintenance foreman, who makes an investigation, estimating number of hours required and approximate cost of material, signs the request and forwards it to work control for preparation of an MWO with the proper SWO account number.

No work is started until an approved MWO is received, and if work is not begun within 30 calendar days of the form's authorization, it is either canceled or extended as the case may warrant. All MWO's issued are supervision okeyed as follows:

1. When estimated labor can be performed in 100 manhours or less, the approving signature of the responsible foreman is required.
2. When estimated labor to be performed exceeds 100 manhours, the approving signature of the responsible general foreman is necessary.
3. When the form covers work to be performed for long term maintenance, the approving signature of the plant engineer is necessary.
4. With the approval of the general foreman of the responsible department, extended MWO's may be written to cover, by groups, labor performed by inspectors, boiler room and compressor operators, or other labor classifications for work performed that is of a routine maintenance nature and does not vary in character. This extended MWO may authorize, in advance, the calendar month time limit for each worker of each group. The total number of manhours to be used in a one-month period must be shown for each worker and totaled for each group.

LUBE POINTS on this turret lathe at North American Aviation's plant in Fresno are indicated by decal numbers in different colors to designate for the maintenance oiler the type of lubricant that is required.

Job orders

Job orders authorize equipment construction and procurement, plant alterations and additions. Superintendents or division heads may request machinery, equipment, or plant expansion rearrangement requirements involving expenditures for materials, labor, or services with this form. JIR's are investigated, and if approved, industrial engineering prepares and processes a job order purchase requisition, or transfer or disposal authorization.

Prior to final disposition to the plant maintenance department, job orders are submitted by industrial engineering to financial for determimination of proper accounts. Responsibility for keeping current records rests with the plant maintenance department. The procedure by which records of all machinery and equipment are established is as follows.

1. Machinery and Equipment Records are completed for all machinery and equipment which

requires regular maintenance but are not required for minor items of small size or low cost, as determined by the plant engineer.

2. Repair and Overhaul Cost Records are established for all machinery and equipment on which maintenance cost records are desired, as determined by the plant engineer. This form is used to post costs of labor and material for all jobs except routine preventive maintenance and replacement of minor expendable parts.

The above records are maintained throughout the period of maintenance responsibility. Whenever a transfer of this responsibility occurs within the company, the records are transferred accordingly. When a unit is transferred out of the custody of the company, the maintenance records are retained for a period of two months and then destroyed.

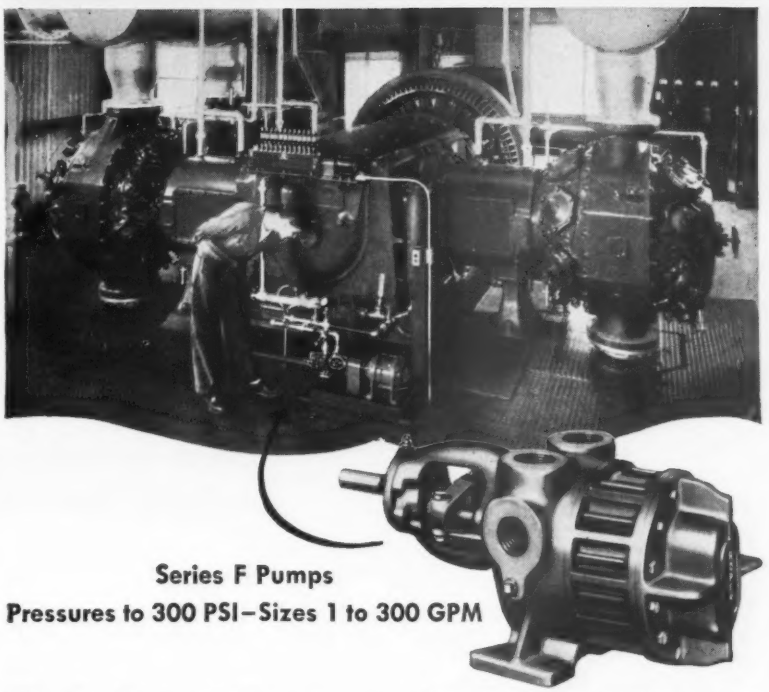
In addition to the above records, the maintenance department also keeps adequate records of the following:

1. Costs of material used to accomplish USAF job orders for which the company will be reimbursed.
2. Overtime labor devoted to the accomplishment of job orders chargeable to USAF contracts.
3. Inspections of elevators for insurance and code requirements.
4. Inspections of fired and unfired pressure vessels for insurance and code requirements.
5. Specialized equipment periodic certification maintenance checks.
6. Catalogs, manuals, and blueprints required for the proper maintenance of machinery and equipment.
7. Equipment lubrication.
8. Gasoline dispensing.
9. Stock materials.
10. Tools.

SELENIUM DIODE applications sought

INTERNATIONAL Rectifier Corp. of El Segundo, Calif., is sponsoring a nation-wide contest for new applications of selenium diodes. A new Ford V-8 Tudor Sedan will be awarded to contestant submitting the most useful practical application, and 50 secondary prizes totaling $1,500 will also be handed out. Any person may participate in the contest.

There's a Dependable ROPER PUMP in this picture!



Series F Pumps
Pressures to 300 PSI—Sizes 1 to 300 GPM

Giant Cooper-Bessemer Compressor Requires Dependable Bearing Lubrication at Every Start... and a Roper Does the Job!

Producing "miracle" drugs at one of the Chas. Pfizer & Co. plants calls for dry, clean compressed air; the above compressor provides this very necessary ingredient. *Where does a Roper pump fit into the picture?* In this case, a dependable Series F is used as an independent before-and-after pump to supply oil to all bearing surfaces. Also, when the compressor is running at slow speeds, the Roper helps to maintain thorough lubrication by keeping lube oil pressure at a safe level.

This is but one of hundreds of special installations where a standard Roper pump is used. If you have a similar application — or if you require a pump for general purpose pumping, fuel transfer, or for hydraulics — you can count on a Roper to do the job . . . *dependably!*

SEND FOR CATALOG 954

ROPER Rotary Pumps

GEO. D. ROPER CORPORATION
Pacific Coast Office, Pump Division
2011 S. Santa Fe Ave., Los Angeles 21, California

SERVICING the controls on a unit heater involves cleaning the pilot, checking the thermocouple and the gas valve. This should be done bi-monthly to insure good operation.

NO HEAT and AIR TROUBLES IF basic rules are followed —

Older systems require most attention and are the most expensive to neglect

IN THE OPERATION of a service department that covers all types of heating complaints from oven pilots to hotel steam boilers, we have found that several basic maintenance rules or routines, if followed regularly, will anticipate and/or prevent operational failure.

While the ultimate end of all heating and ventilating systems is good distribution and draft-free conditions, it is well to keep in mind that all people cannot be pleased all the time. We have learned that a little psychology and a try at the middle ground—that is, by pleasing most of the people most of the time—gets the best results.

Those responsible for plant operation must keep in mind that the older system requires the most maintenance and has the higher repair bills if neglected. It is important, then, that the service man, or in the larger plants, the owner's maintenance man, be a good mechanic and familiar with the control mechanism of the units.

If the system is large enough to warrant a full time mechanic routine, checks at *regular* intervals of the following points will pay dividends in fewer interruptions to operation:

In gas-fired warm air heating and ventilating units bi-monthly check of belts, pulleys, oiling of bearings in blowers and motors, checking for loose bearing caps and screws, checking all wire connections to valves and switches, checking for end play in blower shaft, and last but not least, the cleaning or changing of all filters.

Belts and pulleys

Two things can be observed quickly in inspection of A and B belts, the type most common to blower units: tension and condition. Belt tension may be increased or decreased by loosening motor belts and sliding motor forward or backward. Tension should be as loose as possible without slippage. Replace any belt showing fraying edges, excessive stiffness, or an oily or gummy condition.

By
ROBERT A. WHITAKER
Service Department
Atlas Heating and Ventilating Co.
San Francisco

Pulleys may be checked by sight for alignment and by hand for looseness on the shaft. Care should be used in tightening allen screws to see that they are aligned with the key side of the shaft. Replace split or bent pulleys at once.

Oiling of blower bearings and motors is accomplished through oil cups located at each end of the shafts, using about a 20 S. A. E. weight oil. On multiple blower units, oil cups are installed on both sides of the blower cage. It is well to check motor and blower rotation after any electrical repair in the building or to the unit, as instances have occurred where reverse rotation was found, due to a change in wiring circuits or motor wiring. Needless to say, this would cause loss in efficiency.

Bearing caps and shafts

Keeping bearing cap screws tight will help eliminate noise from the blower and lessen wear on shaft and bearings. It is well to check the shaft for end play at each oiling. If end play is noticed, loosen all cap screws and push shaft in the direction away from the pulley, then tighten all screws.

Wire connections

An important point in checking wire connections to valves and

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We're not Hindu Magicians, we're steel salesmen. As such we know the boss (yours) is trying to cut manufacturing costs—save some money any place along the line.

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FLAT ROLLED AND BAR AND TUBE STOCKS AND PROCESSING SERVICES FROM 11 PLANTS

switches is that any spliced wire connection should be checked for frayed or charred insulation and loosened splice.

Filters

In our service calls to commercial units, about 60 to 70% of complaints are traceable to dirty or clogged filters. It is a time saver to keep on hand a complete set of spare filters, whether they be the metal type or throw-away variety. This would prevent shutdown of the system while cleaning the filters. The interval of cleaning or changing filters is entirely dependent on air conditions of the area and the amount of use the unit receives. In most commercial units a 60-day interval is normal, but it may be as often as every 15 days.

Electrical

There are several electrical "musts" for a service maintenance man, insofar as the electrical circuits and motors of a heating and ventilating unit are concerned. He must know the circuit, from the fuse panel to the unit itself. This enables him to quickly establish if any operational failure is due to outside power failure or a blown fuse. He must be able to check a transformer for failure by shorting across the low voltage side.

CHANGING the filter, oiling the blower and motor on a gas-fired furnace. It is desirable to check motor and blower rotation against reverse direction after any electrical repair to the unit or in the building.

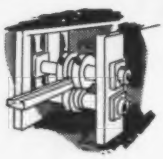
He must recognize the three most common types of motors used in heating and ventilating equipment. Those three are split phase-repulsion, induction and capacitor-start induction-run motors. In the smaller type heating units, the motor will be of the fractional type and capacitor-start induction-run with thermal overload protection. In this type motor, one repair that the service man must be able to make is the replacement of starting switches. It is well to keep a supply of these on hand if there are several motors of this type used on the equipment.

The wiring diagrams furnished with most heating and ventilating equipment are important and should be kept available to the service man at all times.

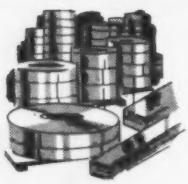
We have found it an excellent time saver for the regular service man to be furnished with a simple layout of the heating and ventilating system even in the smaller type units. With routine systematic checking, the man becomes familiar with all phases of operation, which makes for smaller operating costs and fewer shutdowns.

This company's service records bear out the truth of the statement "A stitch in time saves nine." Firms that carry a full-time service man on their payroll or that avail themselves of our maintenance contract service

CAINE STEEL
roll forming
Complete Facilities UNDER ONE ROOF



ROLL FORMING MACHINES
Caine Steel's cold metal roll forming division is *versatile*...can economically produce both light and heavy roll formed sections on its modern, new roll forming machines.



STEEL SUPPLIES ON HAND
Caine Steel's warehouse division carries large stocks of steel on hand which are available at all times for roll forming requirements. This means greater economy, faster delivery to you.

SLITTING AND HANDLING
Caine has complete steel processing and handling equipment such as coil slitters, shearing, etc., not ordinarily found in shops handling roll forming *only!* This assures faster, better service to you.

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ROLL FORMING DIVISION
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have the lowest repair bills and less operational failures.

The maintenance contract that we and other progressive heating and ventilating concerns offer is a real service to those plants not having a service man of their own. On request we send a survey man to go over each piece of heating equipment in the plant and determine what service is required and how often calls are to be made. An estimate is submitted and upon acceptance the maintenance headache for the management is over.

In case of breakdown, the same service man is sent to take care of the trouble. Due to his familiarity with the plant equipment, much time and expense is saved. We have over 2,000 such service contracts now in force and its universal acceptance shows us that this is an excellent way to handle this problem.

ENGINE TESTING fully automatic

ELECTRONIC experts for California Research Corp., subsidiary of Standard Oil Co. of California, have applied the old piano roll principle in an ingenious new instrument that makes possible fully automatic testing of engines under varying conditions.

The device, for example, can simulate the actual driving conditions a motorist might encounter on a hot summer's day drive and requires no supervision by an operator. The piano roll is actually a continuous loop of 35 mm. film perforated at intervals according to the desired conditions. It plays a set of electronic circuits that control starting, stopping, speed, load, and water and oil temperature.

Don't neglect your FLOOR MATTING

By C. W. HARTRANFT, JR.
Cactus Mat Manufacturing Co.
Los Angeles

FLOOR matting is being recognized more and more in industrial fields as a means for increasing employee efficiency and safety as well as an addition to physical comfort.

Three of the most common materials used for the manufacture of industrial matting are rubber, rubberized fabric and wood. Rubber matting is available in many types, from sponge rubber sheets and corrugated rubber runners to rubber link and rubberized fabric link mats.

Wood matting ranges from rigid and "roll up" type duckboard to wood link. Some companies manufacture wood racks for their own use in carpenter or maintenance departments. The cost is usually high and the quality is often poor. Therefore, many industrial consumers are changing over to standard types of wood matting manufactured by specialists in the field.

The same basic rules for good housekeeping that apply to general shop maintenance may be applied to floor matting. Too often, however, mats are neglected and abused, and as a result fail to give the service that could otherwise be expected from them.

In order for maintenance to be effective, care should be taken in selecting the proper type mat for the particular application under consideration. For example:

1. Matting made from natural rubber, as well as some synthetic rubbers, should not be used when there is more than minor quantities of oil. Matting of this type includes tire fabric link, most rubber link and most moulded corrugated or perforated rubber runners.

2. Corrosion-resistant metal parts should be specified where mats are to be used in the presence of water or corrosive chemicals.

3. Usually mats with large openings should be used where there is considerable droppage of waste materials.

4. Due to construction of women's shoes, a type of mat with relatively small openings should be used where women are working.

5. Where floor surfaces are irregular, flexible mats should usually be selected, so that they will conform to the floor without rocking or tilting. Where rigid type mats are used, they must be designed to bridge over these irregularities.

After proper mat selection has been made, it is important to see that mats are kept clean. Often nothing more is needed than sweeping beneath the mat periodically and an occasional hosing off with water. In cases where mats come in contact with grease and oil, more frequent and thorough cleaning may be necessary. Regular steam cleaning will usually keep mats in good condition. Where strong soaps and detergents are used, mats should be thoroughly rinsed.

Years of extra service can be often had if mats are maintained in good condition. Broken slats or links, bent wires and worn spots are not necessarily indications that mats should be replaced. Damaged or worn mats, like tools, can deteriorate rapidly and become a serious safety hazard. Often plant maintenance departments can make many types of repairs themselves. Some mat manufacturers maintain mobile repair services for making repairs on the spot where this service is desired. Many others are glad to repair mats if they are sent into their plant.

Disrepair costly

Mats that are allowed to deteriorate seriously before repairs are undertaken are costly and often impractical to repair. However, when damage is corrected as soon as it occurs, the life of many types of mats can be extended considerably.

Proper selection and use of door mats has a very direct bearing on floor maintenance problems. Their function in industrial plants is to eliminate trackage of dirt and grit from outdoors to inside floors and floor coverings and to reduce the amount of dust and dirt blown in through open doors.

To accomplish this mission, mats must be large enough to require several steps in passing over them so that dirt will be knocked off shoes. Surface construction of mats should be such as will facilitate this cleaning action, and in addition provide openings through which this dirt can drop below the surface of the mat, instead of being picked up by the next pair of shoes passing over. In other words, effectively to protect floors indoors the entrance mat should be one that has a scraper action on the shoes and at the same time traps the dirt below the mat surface where it will not be tracked or blown inside.

NEW IDEAS, new methods, new products—the medium of exchange at the Plant Maintenance Show and Conference in Los Angeles next month.

Maintenance Show PREVIEW . . .

A sampling of exhibits, products, and literature from the Western Plant Maintenance Show in Los Angeles, July 13 - 15

For literature that you want, or for more information on equipment, circle key numbers on rip-out postcard (page 125).

1

Floor maintenance

A new floor finishing and maintenance file folder is available from *West Disinfecting Co.*, Booth 133. Folder describes West's complete line of floor products and suggests procedures for cleaning, sealing, and maintaining terrazzo, rubber tile, linoleum, concrete, asphalt (mastic) tile, and wood floors.

2

No guesswork here

The Farval Corp. at Booth 134 will distribute a 20-page booklet (26) on its centralized systems of lubrication, which by mechanical means dispense exact measured quantities of oil or grease under pressure to a group of bearings from one central station. A series of six diagrams shows how the Farval Dualine valve on each bearing measures exact charge of lubricant needed. Services offered by Farval representatives listed in this bulletin.

At the same booth *Cleveland Worm & Gear Co.* will offer bulletins on worm gear speed reducers (130) and speed variators (K-100), as well as a 174-page ring-bound catalog which is an encyclopedia of information on Cleveland speed reducers.

3

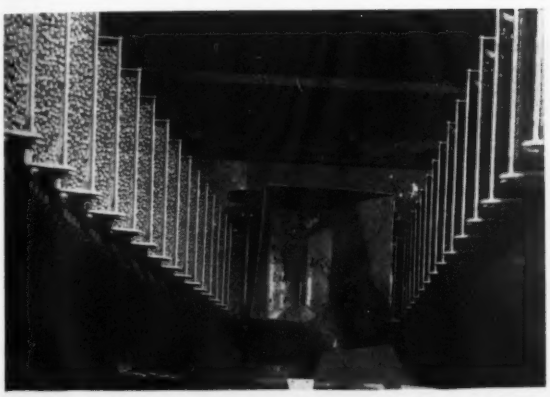
For filtering problems

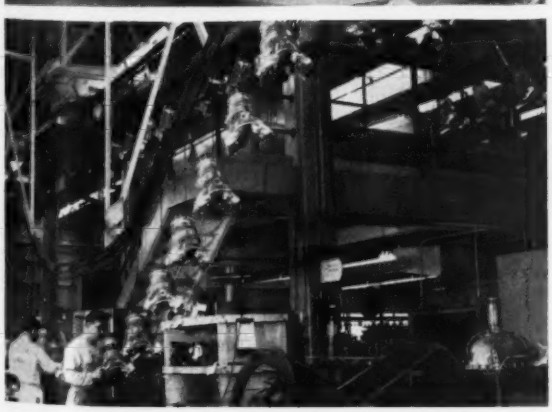
Representative models of Fulflo industrial filters will be exhibited at Booth 445 by *Commercial Filters Corp.* Model 4M-A, shown here, is a new type of filter developed for removal of entrained oil or moisture and solid impurities from compressed air or gasses at operating pressures from 1,000 to 4,000 psi. Descriptive bulletins on particular models and condensed catalog PM 200A give essential data.

SPECIAL ISSUE

MATERIALS HANDLING

AUGUST 1954





TIE IN YOUR ADVERTISING with the FIFTH WESTERN PACKAGING AND MATERIALS HANDLING EXPOSITION, San Francisco, August 17, 18, 19

Reach more than 10,300 equipment buyers in Western plants under timely circumstances . . . This issue ties in with and will be available for distribution at the show, from our booth (#324). Entire editorial feature section will cover materials handling subjects.

FINAL FORMS CLOSE JULY 25

REGULAR RATES APPLY	One page	$280.00	1/2 page	$140.00
	2/3 page	186.67	1/3 page	93.33
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Two tearsheets of your advertisement in the August issue will be mounted on attractive 11" x 14" display cards to help you merchandise products on display. Ask us for more details.

Maintenance Show PREVIEW

. . . Begins on page 100

4

For getting off the ground

Albina Engine and Machine Works, Booth 602, will feature mechanical stirrups and utility hoists for up-in-the-air maintenance jobs, from washing windows to sandblasting or plastering. Literature shows types of equipment available for a variety of jobs and gives general information, including safety features that are of first importance to working crews.

5

Pipe tools for cutting, threading, and reaming

At Booth 674, *Beaver Pipe Tools Inc.* will have on display its Model A, D, and E machines, as well as other equipment. New pipe machine catalog showing these models and a quick-reference general catalog are available, and between the two give a good idea of all Beaver models of pipe and bolt machines, power drives, threaders, and other machines.

6

Tornadoes on tap

Tornado industrial vacuum cleaners will be demonstrated at Booth 505 by *Breuer Electric Mfg. Co.* Cleaner, which has a suction velocity of over 300 m.p.h., picks up oil and water as well as dirt and metal chips. New attachments now add to its usefulness. Literature is available on all Tornado industrial cleaning equipment.

7

Not for sale

Diamond Chain Co., Inc., puts its roller chain drives to the test in a chain-driven clock which will be on display in Booth 309 by *Degen-Fiege Co.*, Los Angeles industrial suppliers. Total speed reduction from motor sprocket to hour-hand shaft is 129,600 to 1. Seven chains are used for the total reduction, all of them Diamond ⅜ in. and ½ in. pitch roller chains. A folder for distribution diagrams and analyzes this feat.

8

Good-as-new department

The Boman Co., Booth 321, will exhibit some of its replacement parts for all makes and models of fork lift trucks, including Clark, Towmotor, Ross, and Hyster. To simplify ordering, company offers an indexed catalog (54) of replacement parts, which contains a 12-page price list.

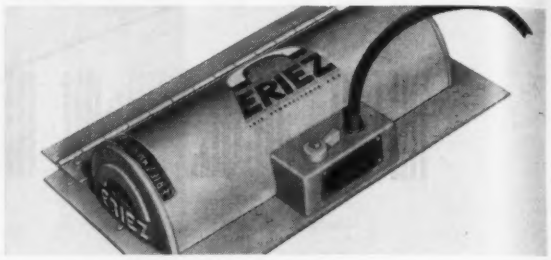
9

Tennant takes the floor

In Booth 333, *G. H. Tennant Co.* will feature floor-maintenance products: a high-speed factory-type power sweeper with combined brush and vacuum system; a floor scarifying machine for picking up encrusted grime from plant floors without solvents or water; a floor machine for dry cleaning hardwood and asphalt tile floors; new, fast-drying concrete hardener for concrete floor surfaces; and concrete floor seal. Also, a high-speed portable chipping machine for removing rust, scale, or paint from tanks, vats, pipes, spray booths, etc.

10

Built-in alarm



New control called Magnalarm, built into magnetic separators, will be demonstrated by *Eriez Manufacturing Co.* at Booth 645. It incorporates Eriez new "ferrometer," an electronic instrument which measures tramp iron accumulation on the magnet and automatically trips an alarm when a pre-set quantity is reached. Complete Eriez line of permanent non-electric magnetic equipment for removal of tramp iron will be on display, and product literature is available at the show or through the mail on Magnalarm, magnetic separators, magnetic sweepers, and other equipment.

11

Thoro system

Waterplug, Thoroseal, and Quickseal are the pillars of the Thoro system for sealing and finishing masonry walls, exhibited by *Standard Dry Wall Products, Inc.*, in Booth 177. Free literature includes a 16-page circular explaining the particular uses each product has, as well as related materials, such as vapor barriers, patching mortars, grouting compounds (17).

12

One-man portable pipe threader

Port-A-Pony, on display in Booth 545 by *Thread-Ezy Mfg. Co.*, has a total carrying weight of 26 lb., and is easily operated or transported by one man. It will thread pipe from ¼ to 4 in. on construction, maintenance, or installation jobs—and work in a 12-in. area. Specifications and list of adaptors are given in illustrated folder.

13

Four new arrivals

Toledo Pipe Threading Machine Co., Booth 539, will feature four new tools recently added to the Toledo line: Toledo 88 power drive, Simpact 1 to 2 in. threader, pipe wrench, and pipe cutter. To introduce them, Toledo has issued a small folder and a condensed catalog, which also describes other items of their line.

14

Signs for safety and savings

Circulars of *Westline Products* Division of *Western Lithograph Co.*, Booth 546, describe company's self-adhering signs for use in plants. Over 200 standard signs are offered for industrial safety. Westline Hazard-stripe tape eliminates the need for painting and stenciling warnings on permanent hazards. Tel-A-Pipes are stock identifications for marking cable, conduit, and pipe. Another product, E-Z-Code, is adapted to marking wires, terminals, and fuses.

COMPARE MOTO-TRUC for...

★ MANEUVERABILITY

★ TRULY FUNCTIONAL DESIGN

★ EASE OF OPERATION

★ EASE OF MAINTENANCE

★ PRICE

Only through diligent comparison can your choice of materials handling trucks be a wise and economical one.

Design features that are *tomorrow's* standards are incorporated in MOTO-TRUCS . . . *today* . . . these features are often copied . . . yet never equalled.

Investigate the *complete* MOTO-TRUC line of Walkies . . . and remember . . . There's a MOTO-TRUC for every purpose.

Send for Bulletin #54

MOTO-TRUC Designers FOR THE INDUSTRY PATENTED

Representatives in Principal Cities

The MOTO-TRUC Co.

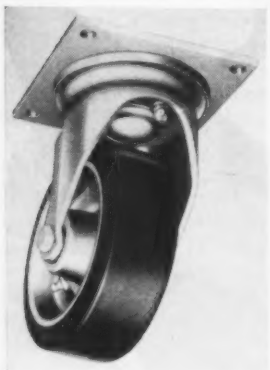
1963 EAST 59th STREET • CLEVELAND 3, OHIO

Pallet . . . Platform . . . Hi-Lift Trucks

LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

15

Less maintenance with sealed casters



The Bassick Co., Booth 327, will feature its "3D" series of sealed casters, shown here, which are designed to minimize caster lubrication. Main swivel bearing baffle ring prevents entrance of dirt and water, a grease retainer prevents loss of swivel lubricant due to vertical drainage, and a wheel bearing seal excludes foreign matter and retains lubricant. Sheet on new "3D" series, as well as 20-page catalog on Bassick "Floating-Hub" shock-absorbing casters, will be distributed.

16

Spray-booth maintenance

Turco Products, Inc., Booths 343 and 345, will exhibit a line of nine paint booth maintenance materials and distribute a pamphlet containing charts on their application. Masking chart shows on which parts of paint booths the materials can be used, how they are applied and removed, drying time, and other features. Deflocculating chart tells the types of finishes handled by each compound, use concentrations, types of equipment, foam factors, and flotation factors. Paint stripping section describes tank paint stripper and spray-on rinse-off paint remover.

17

Junior-sized blasting machine

Vacu-Blast Co., Inc., Booth 552, will exhibit for the first time in the West its new Vacu-Blast, Jr., a moderately priced blasting machine for use in welding and painting shops and other general cleaning or maintenance uses. One-page circular gives operating advantages and special design features.

18

Industrial supplies from A to Z

Warren & Bailey Co., Booths 405 and 409, will exhibit a wide selection of products marketed by this firm as a manufacturer's representative. Some of the circulars to be distributed at the booths cover: Keystone ball and roller bearing grease, no-drip lubricant, and penetrating oil; Manzel chemical feeders and force feed lubricators; Masoneilan air pressure regulators; Mason No. 11 and 12 reducing valves; Vogt valves, fittings, flanges; Corning gauge glasses; Imperial tube fittings; as well as others.

19

Speed reducer bulletins

Two Pacific-Western speed reducer bulletins, one 40 pages long on herringbone type (4802), and the other

No need to hunt for suppliers . . .

The answer's in the YELLOW PAGES!

You don't have to hunt for smart suppliers. They're looking for you. That's why they make themselves a prominent part of the "Classified" section of your telephone directory. In addition to their product or service, they list their name, address and telephone number in the Yellow Pages because that's where 9 out of 10 people turn for information on folks who sell or serve.

You'll find it fast in the YELLOW PAGES!

Pacific Telephone

35 pages on right-angle speed reducers (5203), will be offered by *Western Gear Works* at Booth 334. Photographs, charts, and drawings supplement text in presenting essential data. Western Gear, in addition to displaying speed reducers and related equipment, will show a new product, Tug-Bar, which is a powered 110-lb. tool for moving crated, skidded, or wheeled loads. Circular available.

20

Folding chairs with writing arms

Clarin Manufacturing Co. will show at Booth 274 a new folding tablet arm chair, designed for shop foreman meetings, shop classes, conferences, and other group meetings. Tablet arm is built in, lifts up and down, and can be folded out of the way when not needed. Whole chair folds to a flat depth of 3 in. Descriptive sheet, 4-page folder, and 16-page color-illustrated booklet give more information on this and other Clarin folding chairs.

21

Secure, adjustable scaffolds

Up-Right Scaffolds Division of *Up-Right, Inc.* will exhibit at Booth 434 new one-piece folding section Up-Right scaffold and Up-Right 10-ft. span type scaffold. A circular on each of the two types of equipment has been issued by the company, showing special features: automatic locking hooks, locking casters, building-block extendability, adjustable legs for uneven surfaces. Photographs illustrate advantages of design in safety, compactness, and adaptability.

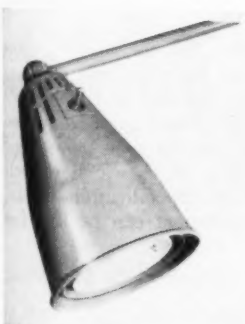
22

Fast handling of materials

E. A. Stevenson Co., Booth 234, will show Rapids Standard Co.'s new magnetic parts and scrap conveyor, designed for use in crowded areas, which has a magnetized belt that can operate at inclines up to 72 degrees. Other Rapistan manufactures on display will be power conveyor, gravity conveyor, and industrial casters. Specifications and data bulletins are available on both the materials handling equipment and casters and trucks.

23

Lamps that stay put and stay cool



Swivelier Co., Inc., Booth 273, will have on display its Dextra-Lites, adjustable incandescent and fluorescent lighting units. The Coolite, shown here, is an incandescent lamp with a metal shade engineered to stay comfortable to the touch after hours of use, and intended for use on machine tools, work benches, inspection tables, drafting boards, etc. This model and others are pictured and described in company's eight-page bulletin.

24

Fiberglas insulation

The *Owens-Corning Fiberglas Corp.* exhibit in Booth 573 will point up maintenance advantages of Fiberglas insulation. Company's 20-page bulletin shows the wide

For Easiest Pipe Work ...it's the New 20 RIDGID

8 sizes for pipe from ⅛" to 6"

More utility for your money in RIDGID Bench Vises

RIDGID Chain Bench Vise, ⅛" to 8"

• No wonder this bench yoke vise is popular everywhere! You can make the yoke open for either right or left hand. It has an integral pipe rest for easier cutting or threading . . . built-in pipe bender . . . strong special malleable yoke and base . . . LonGrip jaws of top quality tool-steel. You simply can't beat it for efficient easy operation that lasts for years! Buy it at your Supply House.

Same work-saver features in RIDGID post, kit and stand yoke vises and bench, post and stand chain vises.

See us at Western Plant Maintenance Show, Booths 639, 643.

THE RIDGE TOOL COMPANY · ELYRIA, OHIO, U. S. A.

RIDGID Work-Saver Pipe Tools

Indair's Sparky answers the demand for ARGON ...the newest gas for inert-arc welding. ARGON is now a standard member on Indair's roster of industrial gases.

INDUSTRIAL AIR PRODUCTS CO.

PORTLAND, OREGON • SPOKANE, WASHINGTON
MEDFORD, OREGON • YAKIMA, WASHINGTON

SWEEPS 45,000 SQUARE FEET PER HOUR!

"MODERN"

INDUSTRIAL POWER SWEEPER

- Exclusive dust control feature prevents dust from escaping.
- Adjustable Sweeping height.
- Direct blower mounting eliminates belts and bearings.
- Control hand grip on sweeper handle eliminates levers or clutch.
- 100% heavy steel construction.
- Powered by powerful 4-cycle air-cooled gasoline engine.
- Riding sulky and wall brush attachments optional.

Write for free literature WI-6

MODERN

MODERN MFG. COMPANY
160 N. Fair Oaks, Pasadena 1, Calif.
Manufacturers of Modern Lawn Mower Sharpeners • Modern Power Edger and Trimmer

See our display at Booth No. 627, Western Plant Maintenance Show, July 13-14-15, at Pan Pacific Auditorium, Los Angeles, Calif.

Maintenance Show PREVIEW

. . . Begins on page 100

range of Fiberglas products—blanket type, molded rigid panels, blocks, and others—for providing maintenance insulation in all temperature ranges. Detailed text and readable graphs give information on picking and installing the right type.

25

Tendons of industry

Two bulletins will be distributed by *Union Wire Rope Corp.* at Booth 252 on high carbon wire, wire rope, and braided wire sling fabric. One is a pictorial tour of company's Kansas City plant; the other a catalog of Tuffy sling types, dimensions, weights, and safe loads.

26

For anchoring machines

The Felters Co. at Booth 506 will answer questions about Unisorb felt pads for mounting machines. For those who can't be there, the next best thing is the company's booklet "Questions most frequently asked about Unisorb," with the answers, and other published information about felt insulation for reducing vibration.

27

For heavy loads

Newman Manufacturing & Sales Co., Booth 250, will display the Newco combination clamp and thimble (shown here), sling saddle, and sling bridle. A 4-page folder on clamp and thimble describes its advantages: easy to install, no wrong side, bolts and nuts replaceable with any standard machine bolt, smooth and durable finish. Another folder describes sling saddle.

28

Floor scrubbing by the acre

Gasoline-powered Scrubber-vac (Model 218G), mop truck (Model 2R), floor machines for scrubbing or waxing, and vacuum cleaners will be featured in Booths 139 and 141 by *Finnell System, Inc.* Show-goers may see another piece of equipment, an entirely new method of operation for scrubbing large floor areas, which Finnell hopes to have ready for the show. Specification sheets, with photographs, on Finnell equipment can be had for the asking.

29

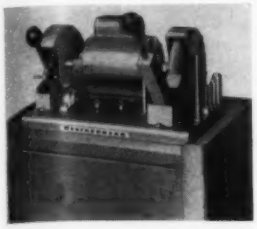
Spotlight on champions

Oster Manufacturing Co. will feature its No. 142 Featherweight Champ power drive and No. 432 Lightweight Champ power vise stand at Booth 240, in a display of tools and machines. Literature offered by Oster includes a condensed catalog on pipe and bolt threading machines (53); bulletins on a complete portable pipe and bolt machine, and an electric sewer cleaning machine; as well as bulletins on the "champs" that are highlights of their exhibit.

30

Good care for heavy-duty hose

The Weatherhead Co., Booth 439, will show its new CS-10 cutting and skiving machine for wire braid hose, shown here. Machine cuts and skives (peels) hose for use with Weatherhead reusable couplings, and does the job accurately in a fraction of the time it takes to do it by hand. Also on display will be Model HD-1 cabinet for storing hose and couplings. Both units are described in 4-page folder issued by company. Catalogs on industrial brass fittings, Ermeto tube connectors, and reusable hose couplings are also available, and these products will be a part of the Weatherhead display.



31

Keep oils and coolants like new

Honan-Crane Corp., Booths 657 and 661, will have on display the following equipment: bulk type refill oil purifier, cartridge type refill oil purifier, magnetic separator, "T" type coolant clarifier, Dri-pure water-oil separator, and tubular conveyor. Bulletins on the exhibits list applications and describe in detail how equipment operates.

32

Management maintenance

Remington Rand, Inc., Booth 305, will display materials for setting up a maintenance control system. Folders containing sample Kardex records (maintenance record, inventory control of maintenance parts, and equipment record) will be given upon request to interested persons, as well as a general bulletin on requirements for an effective maintenance control system. A wide variety of other literature on Remington Rand products and services will be available.

33

Try-it-yourself exhibit

A model service shop for small motors will be part of *General Electric Co.'s* exhibit, and the testing instruments, leak detectors, and panel instruments are open for inspection—or operation—by show-goers. Over-all theme of the G-E exhibit, occupying Booths 239 and 243, is productive maintenance material, and company will have on display its new Tri-Clad 55 motor.

34

Servants of industry

Booth 376 will be occupied by the *National Industrial Service Assn., Inc.*, trade association of the electrical service industry. Its members throughout the United States, as well as Canada, Cuba, Hawaii, Mexico, and Puerto Rico, are persons or firms who repair, alter, maintain, and service electrical and mechanical equipment. Functions of the NISA, as explained in folders published by the association, include a code of business practice and set of rebuilding standards for electric motors and transformers, subscribed to by members.

NOW! A Long-Sought Production Aid from industry's most complete line of filtration equipment

HOFFMAN Vacu-matic FILTER

for automatic, continuous filtering of water soluble coolant from grinders, hones and other machine tools

Write for Bulletin A-915

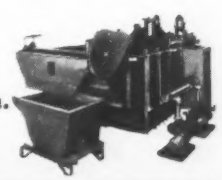
Once again Hoffman meets your particular filtration problem with equipment specifically designed for the job! The "Vacu-matic," a continuous suction, endless belt filter, serves individual machines with clean coolant *automatically*. Uses vacuum (not gravity) for high flow rates — coolant is drawn through belt which deposits solid particles as dry sludge in tote box for easy removal.

Air moving through the filter belt not only dries the sludge, it keeps coolant at or below room temperatures—reduces bacteria common to dirty coolant. The "Vacu-matic" is complete, compact, ready for hook-up on present machines. Two sizes — for 20 g.p.m. and 40 g.p.m.

High Flow Rate • Self-Cleaning
Dry Sludge • Keeps Coolant Cool

Hoffman's nationwide staff of filtration engineers is ready now to give you details on how "Vacu-matic" can protect the production of your machine tools. Like all Hoffman specialized filtration equipment, the "Vacu-matic" is designed to pay for itself by reducing down time, extending tool life, and safeguarding quality control. Write today for free technical bulletins.

For Groups of Machines
HOFFMAN FLOTATION SYSTEMS—*20 to 1,000 g.p.m.*
Fully Automatic
Write for Bulletin A-690



Hoffman
INDUSTRIAL FILTRATION EQUIPMENT & SERVICE
U. S. HOFFMAN MACHINERY CORP., 255 LAMSON STREET, SYRACUSE 6, N. Y.
In Canada: Canadian Hoffman Machinery Co., Ltd., Newmarket, Ont.

SAN FRANCISCO: Bolilove Co. GLENDALE: Chester Paul Co.
DENVER: Burson Sales, Inc. SEATTLE: Dawson Machinery Co.

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STEEL Stanho PRODUCTS

Stainless Steel TAPER PINS

Complete stock, all sizes #7/0 through #14.
Special sizes to order.
Milled or Centerless Ground (Precision Type).
Made to accurate tolerances.

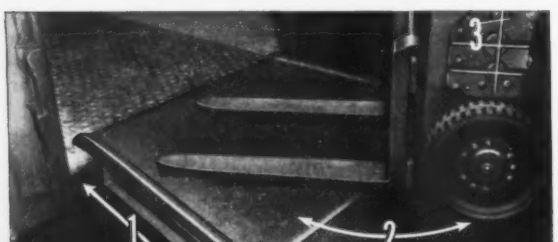
Also "Stanho" Taper Pins made from selected screw stock, Monel, Brass, Aluminum or other metals. Clean bright finish —prompt shipments.

Write for description and prices.

JM-6

STANDARD HORSE NAIL CORP
Since 1872 NEW BRIGHTON PA

Western Factory Sales Representative
GRETHER & GRETHER, P. O. Box 47, Stockton, California



THIS light-weight HEAVY-DUTY MAGCOA DOCKBOARD IS

A BETTER INVESTMENT—*here's why*

There are three reasons why this is the perfect Dockboard for *this* installation. (1) It is the exact length required for *this* car-to-dock span, with proper allowance for car width variations. (2) The dock end of the board is flared just enough for use on *this* narrow dock, permits part of the turn to be made while the truck is on the board. (3) It is built for weight requirements of *this* company's handling equipment and loads, with a margin of safety to spare.

Your dock is different and your local Magcoa Representative knows it. He's a loading dock expert—thorough and quick in fitting a Magcoa Dockboard to your specific needs. Then mass-production specialists at the Magcoa factory take over. Result: a light-weight HEAVY-DUTY Dockboard that solves your specific problems, quickly . . . and permanently.

Safety, Service, Facts—Quarter-round safety curbs, one-piece hand holds and the other Magcoa safety and efficiency features make your Dockboard safe, permanent equipment. You get Magcoa Service, too, if abuse or misuse puts your Dockboard out of operation. Our free new Facts File gives you all the facts. It's yours for the asking.

MAGNESIUM COMPANY OF AMERICA
MATERIALS HANDLING DIV. • East Chicago 17, Ind.

Maintenance Show PREVIEW

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35

Fast and light

Porter Cable Machine Co., Booth 601, will display its new portable electric band saw for cutting metals, plastics, and other problem materials with speed and accuracy. Model 524 weighs only 16 lb., not much larger than a hand hack saw, and can be operated in any position—overhead, vertically, or within ¼ in. of floor. Illustrated folder shows new saw in use on plumbing jobs, cutting stock right in the bin, and other jobs.

36

New Simplex products

Templeton, Kenly & Co., Booth 543, will display and demonstrate by means of a plastic model the new Simplex Re-Mo-Trol, a remote-control hydraulic puller for both pulling and pushing. Equipment can be used with connecting rod for pulling axles and shafts. Other new Simplex products to be displayed include the A1022, a lightweight ratchet lowering lever jack, and the Rol-Toe, a hydraulic jack which has lifting capacity on the toe equal to lifting capacity on the cap.

37

For safety's sake, find the flaws

A Magnaflux inspection unit, specially designed for maintenance and safety inspection, will be displayed at Booth 617 by *Magnaflux Corp.* Descriptive sheet tells how Model KH-05 can be wheeled into the plant to conveyors, punch presses, cranes, and other heavy equipment for magnetic particle inspection. Magnaglo kit can be used with the KH-05 for the most sensitive and rapid inspection.

38

Kelite Spray White in action

At Booth 421, demonstrations of Spray White, new all-purpose cleaner manufactured by *Kelite Products, Inc.*, will point up cleaner's special features: no heat, no odor, no fumes, no solvents, no skin-burn. Among other Kelite manufactures on display will be the automatic oil-fired steam cleaner shown in picture. Literature on this model, also the gas-fired and fireless steam cleaners, and Spray White, can be picked up at the show or requested by mail.

39

Low costs on high maintenance

The Patent Scaffolding Co., Inc., Booth 339, will distribute a booklet titled "Controlling Costs When Maintenance Goes Above Arm's Reach," an eight-page guide to the right equipment for overhead maintenance. Company's Gold Metal and Trouble Saver lines of ladders and scaffolds are diagrammed and photographed on actual jobs. Other bulletins are offered, including one on the Fold-A-Way aluminum scaffold, a safe, light-weight, "no acrobatics" piece of equipment.

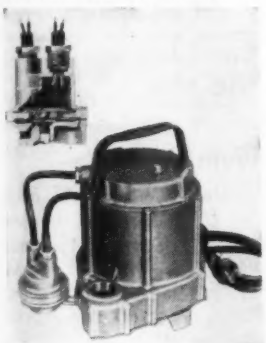
40

Vacuum cleaner for wet or dry pick-up

Don't pass by the "By-Pass" motor which makes this vacuum cleaner suitable for picking up scrub water! It will be shown by *The Kent Co., Inc.*, in Booth 673. Used for wet pick-up it's a teammate for the Kent floor machine in areas where floors must dry quickly so that traffic flow is not interrupted. Same machine also dry-vacuums bare floors, carpets, even boiler flues. Specification sheets with photographs are available on both vacuum cleaner and floor machines.

41

Works under water



Kenco, Inc., will use plastic tanks in Booth 619 for a demonstration of its entire submersible line of centrifugal pumps, which handle a wide variety of liquids. In addition, models on the floor will demonstrate the flexibility, with slight modification, of Kenco pumps. Model 109A is pictured here. Literature on Kenco equipment gives specifications, capacity, and other details.

42

Changing the guard: new insulation process

Larsen-Hogue Electric Co., at Booth 555, has on display a new protection for electric motor windings known as the A.I.M. insulating process, which uses new epoxy resins. Folders available for distribution tell about Larsen-Hogue's services to Los Angeles area in motor, generator, and transformer rewinding and repair, services that require experience and equipment.

43

Non-slip steel floor

Alan Wood Steel Co. will exhibit at Booth 523 its Algrip abrasive rolled steel floor, claimed to be the only product of this kind manufactured in the world. An 8-page descriptive folder gives specifications and fabricating data. Inappropriately (but only for this show) Algrip, under both dry and wet conditions, requires no maintenance.

44

Portable oil cleaners

Mayhew Products Co., Booth 152, will feature portable oil and solvent reconditioning units, recommended for saving: oil, equipment, down time, maintenance, labor, storage, and disposal problems. The adaptability of these portable units to a variety of operations is pointed out in a 4-page folder, which also pictures models available.

If you want to reduce your materials handling cost... speed up loading and unloading... lower your accident rate... then you need a Bronco Magnesium Bridge Ramp.

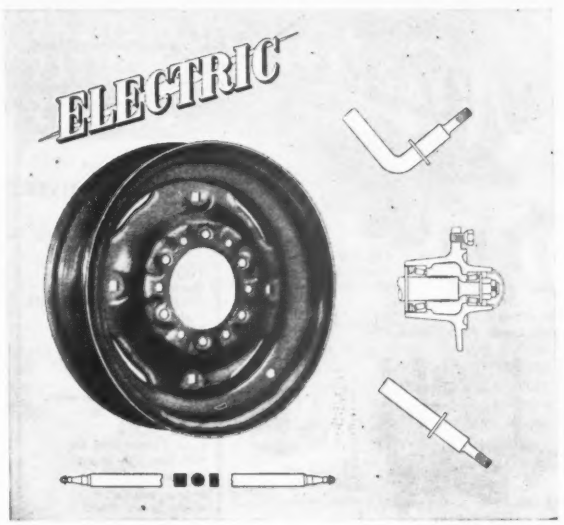
Bronco Ramps Give You These Outstanding Features

★ Low initial cost—lifetime service
★ Maximum strength—minimum weight
★ Safety tread surface for full traction
★ Positive, adjustable locking device
★ Side guards designed to prevent tire damage or equipment run-off
★ Carloading or Truck Ramps—Capacities from 1000 to 12,000 lbs.

BRONCO
Magnesium
BRIDGE RAMPS

Write today for information on the complete line of Bronco Bridge Ramps.

BRONCO PRODUCTS CO.
717 Stanford Avenue
Los Angeles 21, Calif.



A Wheel for Every Job!

Our engineers will recommend the most efficient and economical wheel and axle assembly for your unit. We invite your inquiries.

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STOP THE
BIGGEST THIEF IN AMERICA

OAKITE GIVES YOU
THREE WAYS
TO FIGHT RUST

Day and night—wherever your steel is stored or handled—RUST, the biggest thief in America, is robbing you of production, robbing you of profit.

Oakite can help you defeat rust these three ways:

☆ 1 By removing rust from raw steel.

☆ 2 By preventing rust during processing.

☆ 3 By preventing under-coat rusting of painted products.

FREE For the Oakite Anti-Rust Kit describing these ways to stop RUST in your plant, write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

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OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

TRADE MARK REG. U. S. PAT. OFF.

Call Nutting For TRUCKS WHEELS CASTERS

FIG. 1482 Heavy duty bar handle platform truck

FIG. 1501-X "Auto-Load" Barrel Truck

FIG. 1011 Balance-type platform stake truck

FIG. 1112 DPL Light weight 2-wheel utility truck

FIG. 15 Western Pattern with Steam Bent Handles

FIG. 215 Golden Gate Pattern

WEST COAST REPRESENTATIVES

DENVER
McDonald-Hunt Scale & Supply Co., 1540 Wazee St.

HONOLULU
Chapson & Stickler, Ltd. 755 Sheridan St., P.O. Box 2822

LOS ANGELES
H. L. Stewart & Associates 1547 Estudillo Ave.

OAKLAND
E. C. Buehrer Associates, Inc., 351 Fifth St.

TUCSON
L. J. Clarke and Co. 426 East 7th Street

PORTLAND
F. E. Bennett Co. 426 N. W. 6th Ave.

SALT LAKE CITY
Equipment Supply Co. 16 Post Office Place

SEATTLE
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Since 1891 NUTTING TRUCK AND CASTER COMPANY
1725 Division St. W., Faribault, Minn.

Maintenance Show PREVIEW

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45

A stitch in time

Walter G. Legge Co., Inc., Booth 551, will exhibit materials for preventing slip and fall accidents, and explosion hazards due to static electricity—at the same time that floor appearance and economy of operation are maintained. Safe maintenance practices, states the company's literature, require clean surfaces, and may further call for slip-resistant polishes, floor seals, conductive spark-proof coating, abrasive slip-resistant materials. Special products, such as a grounding device and a conductive bootie, insure against human lightning rods in hazardous areas. Literature describes the hazards and multiple ingenious solutions offered by company.

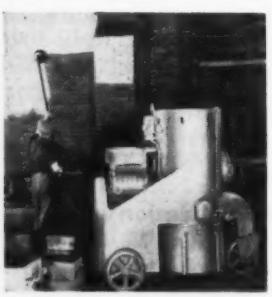
46

Time and temper saver

Two-way mobile radio helps keep materials moving quickly and smoothly. This is the message of a booklet entitled "5 Trucks Do the Work of 6," which will be distributed by *Radio Corp. of America, RCA Victor Division*, from Booths 323 and 325. In the case history discussed, two-way radio proved to be efficient in spite of tons of steel stock, machinery, and steel-reinforced concrete used in building construction, and the problem of machinery noise was solved with special equipment installed on trucks assigned to noisy areas.

47

Heavy-duty portable vacuum cleaner



Hoffco-Vac No. 75, made by *U. S. Hoffman Machinery Corp.*, Air Appliance Division, will be demonstrated at Booth 568, along with a 4010 industrial blower. Unit can be used where aisle clearance is only 40 in. and has a 7½ hp. motor, enabling it to operate two 1½-in. hoses up to 100 ft. long simultaneously. Designed for continuous cleaning of dust accumulations, it can also be used as a production tool for spot operations.

48

Magic Doors for your plant

Magic Door Division of *The Stanley Works*, Booth 403, will feature automatic controls for opening and closing industrial doors. Company will offer free literature describing automatic operation of doors that swing, slide, or fold by means of photoelectric devices, pull cord, push button, or floor plate.

49

Get competitive!

So says *Quijada Tool Division* of *Gaines-Collins*, manufacturers of automatic pipe threaders and cutters, who will display their equipment in Booth 140. Literature will be available on Chief pipe threader, E-Z cutter, and Thred-o-matic 44, and each specification sheet has a table giving speeds of Quijada tool for use in measuring against other methods.

50

Lubrication tips

At Booth 340 *Lincoln Engineering Co.* will supply the following product catalogs: one on industrial application equipment for productive maintenance (64) another on centralized lubrication systems (80-1); and a third on materials dispensing equipment (40). All catalogs have selection charts, in addition to equipment listings, and are generously illustrated.

51

Good air: a maintenance problem

H. H. Robertson Co., Booths 455 and 457, will offer catalogs on ventilating louvers, both fixed and operating, and round type ventilators. The second catalog includes general data and a table of air-change requirements per hour for specific plant operations—such as foundries, glass furnaces, grain elevators, paint spray areas—as well as detailed descriptions of Robertson models. A third bulletin explains Galbestos roofing and siding material, an asbestos-protected metal manufactured in three types and also in flat or corrugated sheets.

52

Safety products

The Protectoseal Co., Booth 654, will have on hand two catalogs on its products for safe transferring, storing, and dispensing of flammable liquids. The first, "New Protectoseal Safety Products," pictures and describes a number of types of safety, oily waste, and production cans, as well as hand transfer pumps, self-closing faucets, and pressure relief bung fittings. The other, "Equipment for Gasoline and Diesel Transportation and Bulk Storage," covers types of storage tank flame arresters, fuel tank safety caps, tank car dome devices, and other fire prevention equipment.

For literature that you want, or for more information on equipment, circle key numbers on rip-out postcard (page 125).

53

Introducing two new tools

The Capewell Manufacturing Co., Booth 623, will show its complete line of pipe tools, hand and power hack saw blades, and band saw blades, featuring two tools recently added: No. 51B ratchet pipe threader, and heavy-duty pipe wrenches. Pipe threader, which works either by power or by hand, threads pipe in sizes from 1 to 2 in., with size selector for instant change from one to another. Wrenches are available in nine sizes, from 6 to 48 in., and employ a patented spring in wrench handle to insure immediate grip or release of jaw. Wrench parts are interchangeable with other leading makes. Specification sheet on each tool pictures and describes design details. Also available are three handbooks with operating tips on hand hack saws, power hack saws, and band saws.

NOW 3 Convenient West Coast Service Centers for Dependable **Dick** POWER TRANSMISSION AND CONVEYING EQUIPMENT

To give you faster service, R & J Dick Co. now maintains three West Coast offices and warehouses—at Los Angeles, San Francisco and Seattle.

Each center is ready with the complete line of *dependable* Dick power transmission and conveying equipment . . . accepted by manufacturers who rely on the Dick line to help them avoid costly breakdowns and repairs. For information on how you can step up the efficiency of *your* production, call or write the office nearest you.

FACTORY SALES REPRESENTATIVES FOR
Atlas Roller Chain • Sewall Roller Chain Sprockets

BARRY STEEL SPLIT PULLEYS

Scientifically designed. Electrically welded. Light weight. Easily installed. Maintain exact shape under all loads.

DICK ROPE QD SHEAVES

Heavy duty "quick-demountable." On or off shaft in minutes. No wobble or loss of balance. 802 stock sizes fit over 25,000 stock drive combinations from ½ to 600 hp. *Also* . . . stock V-Belt drives and "special" sheaves for every application.

DICK'S BALATA BELTING

Hard surface, closely woven duck, thoroughly impregnated with Balata Gum. Free from stretch and shrinkage. Moisture resistant. High transmission efficiency.

BARRY CONVEYOR PULLEYS

Light weight combined with super strength. Welded steel construction. Easily installed. Wide range of sizes for all general conveyor services.

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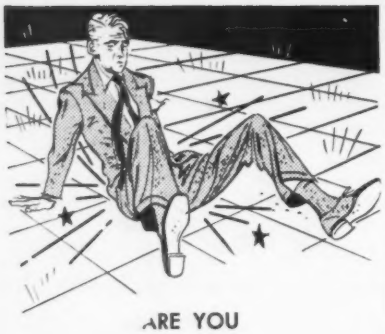

ARE YOU

falling

FOR A FAULTY FLOOR POLISH?

A good floor polish has 2 main functions. It has to protect your floors. And it has to protect the people who walk on them.

LEGGE Polishes start with Safety. Their co-efficient of friction goes up to *75%* beyond Underwriters Laboratories' requirements for slip-resistance. That means the danger of slip-falls—and the liability suits which follow—are practically nil. One large institution* which formerly averaged *8* falls a month reports *no accidents in a year* since changing to LEGGE.

LEGGE POLISHES WON'T BE "WALKED OFF"

Repeated tests show LEGGE Polishes stay on the floor for *months* without the need for stripping. This added protection assures you of gleaming floors that look better, last longer and cost you *far less* to maintain.

BEWARE OF CURE-ALLS

No single polish can answer the needs of every floor. LEGGE formulates a large variety of polishes each suitable for a specific type—or condition—of floor. A LEGGE Safety Engineer will gladly examine your floors and recommend the proper products. No cost for this service. No obligation.

Just write today.

WALTER G. LEGGE CO., Inc.

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YOU'RE SAFE WHEN YOU HAVE LEGGE TOMTARD ON

LEGGE SYSTEM of Safety Floor Maintenance

MAINTENANCE TIPS

HERE are handy bits and pieces of ideas and hints on maintenance methods. They come from comments in answer to a questionnaire distributed among a number of WESTERN INDUSTRY readers.

1. What maintenance schedule do you have?

A shipbuilding company: We have no particular schedule, but we keep one to two men working continuously on buildings, ways, and dock upkeep. We handle occasional major repair or alteration work by taking on additional men during slack periods.

A cotton oil producer: Our department foreman carries out a daily inspection and our night shift foreman does the same thing. Trouble spots are listed in a loose-leaf notebook.

Lindsay Ripe Olive Co., Lindsay, Calif.: Our shop foreman is in charge of maintenance and he reports to the plant engineer, who in turn reports to the plant superintendent. A garage mechanic handles maintenance of trucks, pickups, cars, and fork lift trucks and consults the shop foreman when necessary. The foreman of boilers and retorts handles maintenance of these items and also consults with the shop foreman. Maintenance work of a non-urgent nature is applied for by the department head of the department in question. He consults with the plant engineer and the shop foreman as to when the job will be done, how it will be done, and who will pay the bill.

A chemical company: Each department has its daily routine inspection and reports problems that seem to be developing rather than emergency repair needs. An annual overhaul is planned during the company's vacation period.

Denver Fire Clay Co., Denver: We check our electric motors monthly, with special attention to contactors and switches. Our sprinkler system, lift trucks, and other equipment are checked weekly.

National Lead Co., San Francisco: We have a program of regular motor overhaul and semiannual equipment inspection. The work is scheduled by use of work orders.

Empire Millwork Co., Sutherlin, Ore.: At the close of a shift we have two operating millwrights go over all equipment looking closely for damage, making repairs, checking lubrication, and making any necessary adjustments. At the end of each week they check each speed reducer and change or add oil as needed. All power transmission equipment is checked and repacked, as are pumps and compressors. We also rewash and blow down boiler tubes in the steam boilers and cleaning grates.

A lumber company: Our program includes daily inspection of powerhouse turbines and auxiliaries, semiannual inspection of boilers, yearly inspection of motors, and every two years on turbines. All remaining machinery is inspected by maintenance men every hour.

A chemical company: We have a regular maintenance schedule for all mining and milling machinery, plus regular weekly safety inspections of all hoisting and hauling equipment.

2. What have you found to be the most important thing to bear in mind regarding the following items of maintenance:

(A) Lubrication

Convair Plant No. 2, San Diego: We maintain a complete lubrication chart fastened to each piece of equipment. Carefully trained oilers daily check oiling and greasing.

A chemical company: Regularly scheduled lubrication with the proper lubricant is most important. Lubricating equipment should be kept clean at all times. Oil pumps and valves should be checked several times each day.

National Lead Co.: One man in each department should be responsible for oiling, greasing, etc. Lubricant should be stored in a clean area and containers kept covered. If possible, lubrication should be standardized on a minimum number of lubricants.

A food processor: Too much oil is as bad as too little.

A chemical company: A regular routine should be set up, with machine operators carrying as much responsibility as possible.

(B) Pumps and compressors

Denver Fire Clay Co.: Inspect

motors and switches regularly and periodically change oil in compressors. Drain condensation daily.

A chemical company: From a maintenance standpoint it would be helpful if industry could further develop the packing-less pump.

National Lead Co.: Practice good housekeeping, proper maintenance, and check for wear and cleanliness of equipment as often as required.

A lumber company: Compressor valves should be cleaned every six weeks or more often if needed. Use accurate pressure gauges to maintain standard generating pressure and check equipment closely for increasing vibration.

(C) Power transmission equipment (belts, gears, speed reducers, etc.)

National Lead Co.: Schedule regular daily inspection and keep equipment clean. Once a year dismantle and inspect internally. Don't overlubricate. Check and maintain proper tension or clearances and change oil semiannually.

Denver Fire Clay Co.: Each time motors are inspected, the maintenance personnel should check drive belts, couplings, the oil level, and all the gear units.

(D) Steam generation and transmission

A chemical company: Maintain careful oxygen control, keep an eye on steam traps, and test oil for sulfates and corrosion.

National Lead Co.: Maintain a regular blow-down schedule, proper feed water treatment, keep tubes clean, and watch feed water pump pressures.

Denver Fire Clay Co.: Check water level daily and open up boilers to check controls twice each year.

Convair Plant No. 2: Maintenance should include proper water softening procedures and treatments to prevent scale, pitting, etc.

A lumber company: Steam generators should be checked internally every six months with daily external inspection. Transmission should be checked daily.

3. Anything else about maintenance you want to pass on to us?

A lumber company: Frequent inspections are necessary to catch small troubles and thus eliminate big breakdowns resulting in loss of time. Maintenance men should thoroughly understand the equipment they look after in order to recognize any change in its operation.

Convair Plant No. 2: Careful instruction and supervision of operators will cut down machine breakdown and maintenance.

Denver Fire Clay Co.: Every employee should be alerted to report any apparent defect, anywhere in the plant, to maintenance men.

National Lead Co.: Record air gap readings on all motors having plain bearings in order to keep a yardstick of bearing wear. Maintain a supply of air connection washers to stop air hose leaks. Such air losses are expensive.

A chemical company: Studies showing a dividing line between plant maintenance and outside contracts for large maintenance jobs or small construction projects are needed.

A cotton oil producer: From a maintenance point of view we have found it best to operate three 8-hour shifts, seven days a week, with one day a month down for boiler inspection.

Everything moves faster on a **COLSON** caster

SLOW MOVING ITEMS can sometimes become best sellers with the addition of smooth, easy-rolling Colson Casters. For almost half a century Colson Casters have been known for trouble-free service and long life. Write for catalog describing 1458 different sizes, types and styles of casters designed for every purpose.

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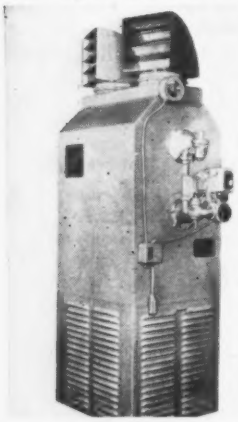
NEW EQUIPMENT & MATERIALS

USE RIP-OUT POSTCARD for more information on products introduced this month

54

New gas fired warm air space heaters



Two new gas fired warm air space heaters now supplement Paraflo line of oil fired heaters. Known as Model 20-G with a capacity of 200,000 BTU per hour and Model 25-G with a capacity of 250,000 BTU per hour, these new units are suitable for use with natural, manufactured or mixed gases and liquified petroleum. *For further details, circle key number on rip-out postcard.* Dravo Corp.

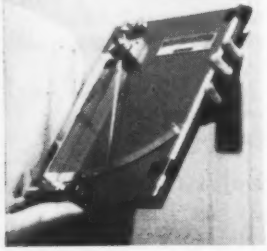
55

Combination wrenches offer facility

A new series of four combination open end Boxocket wrenches features single hexagon openings on the Boxocket end. Openings provide extra gripping power for slightly undersized or chewed-up nuts and on Parker-Kalon self tapping screws with mounted corners. They are also said to prevent damaging brass or other soft metal fasteners in fittings. *Circle key number on rip-out postcard for further information.* Snap-on Tools Corp.

56

Measures ozone



This simple, portable "ozonometer" is said to accurately measure ozone concentration. Instrument is currently being used to find means of preventing ozone cracking in rubber products. *For further details, circle key number on rip-out postcard.* The B. F. Goodrich Co.

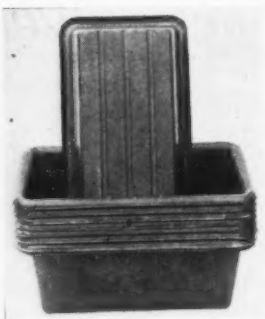
57

Here's a water-thinned high-gloss enamel

Water-thinned, high-gloss enamel is finally available for professional and institutional use. "W-2" interior gloss is one of a new paint line claimed superior in performance, application efficiency and quality appearance. Applicable with spray, brush or roller, paint is said to be non-inflammable, odorless, and non-toxic. Dries dust-free in an hour. *For facts and figures, circle key number on rip-out postcard.* New West Paints & Chemicals, Inc.

58

Light tote box for heavy service



This new plastic tote box is formed from glass fiber reinforced polyester. Size 24 x 14 x 9-in. weighs only 3 lbs. yet will support 75 lbs. Features include nesting, positive cross-stacking and flame proofing in excess of armed services specifications. *For more details, circle key number on rip-out postcard.* Equipment Engineering Services.

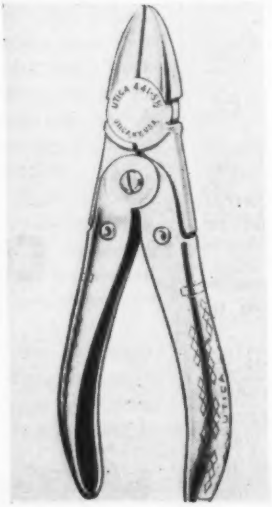
59

Radial saw reduces plant maintenance problem

A new portable 10-in. radial saw designed for easy movement from department to department is claimed to cut plant maintenance headaches. Tool weighs only 243 lbs., comes equipped with detachable wooden handles for easy carrying by two men and can be transported through ordinary doorways. Saw is said to offer all accuracy, practically all versatility and exclusive features of larger Delta radial saws. *For details and specifications, circle key number on rip-out postcard.* Rockwell Mfg. Co.

60

Cutter good for repetitive operations



New 5½-in. compound leverage action diagonal cutting pliers, No. 441, have extra hardened forged jaws and hand honed cutting edges. Handles are steel stampings and are fitted with spring that opens jaws automatically. Hand fatigue is reduced to a minimum. *For more complete details, circle key number on rip-out postcard.* Utica Drop Forge & Tool Corp.

"For over twelve years, the U.S. Rubber Company..."

HARRY E. HUMPHREYS, Jr.
President,
United States Rubber Company

"For over twelve years the United States Rubber Company has offered its employees the Payroll Savings Plan, whereby they can systematically and regularly save in United States Savings Bonds. Over those years, tens of thousands of our employees have joined the Payroll Savings Plan with direct benefits to themselves and their families. Such employees are better employees because with more personal security and freedom from economic worry, there is less absenteeism and personnel turnover, fewer accidents and greater employee responsibility. Such regular investment in Bonds contributes also to the economic strength of the nation. By thus promoting a sounder dollar, business also directly benefits itself. That's why we at United States Rubber endorse the Payroll Savings Plan for Savings Bonds."

Mr. Humphreys cites three important benefits of the Payroll Savings Plan: Payroll Savers build personal security ... production curves reflect serious-minded workers and reduced absenteeism ... the national economy is strengthened by a growing reservoir of future purchasing power—more than 49 billion dollars in U. S. Savings Bonds, *cash value*, held by individuals.

There is still another big advantage in the Payroll Savings Plan: it is easy to install and maintain.

If you do not have the Payroll Savings Plan, or if you have the Plan and your employee participation is less than 60%, here's all you have to do to help your employees, your company and the country:

Write today to Savings Bond Division, U. S. Treasury Department, Washington, D. C. Tell them you want to join the United States Rubber Company and the 45,000 other companies that are making an important contribution to national security and a sounder dollar.

Your State Director, U. S. Savings Bond Division, will contact you promptly. He will explain the simple procedure of installing the Plan and will show you how to conduct a simple, person-to-person canvass that will put a Payroll Savings Application Blank in the hands of every man and woman in your plant and offices.

That's all you have to do. Your employees will do the rest. They are as interested in their own future as you are in yours. Give them an opportunity to build personal security for themselves and a better America for their children.

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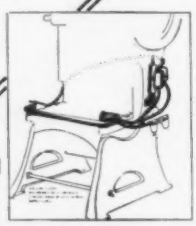
HAZARDOUS OPERATION ELIMINATED

MACHINE PRODUCTION INCREASED



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CONTROL VALVES

PILOT VALVES

All components required for complete automatic and sequence circuits:

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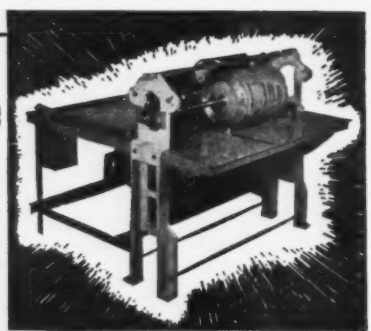
practical answer to the increasing importance of production line marking!



The INDUSTRIAL AUTO-PRINTER

Use the Industrial Auto-Printer to print your multiwall bags and corrugated containers as you need them—to speed up your production and simplify your marking problems.

Completely eliminating expensive hand stencilling, the Auto-Printer has more than met requirements for imprinting, coding, dating, addressing and other marking. Adaptable to almost any size or type of container, it prints at up to 2000 impressions per hour — legibly and accurately.

In hundreds of plants, Auto-Printers are setting appreciable records for saving marking time and labor where efficiency, accuracy and speed are demanded.

We are also prepared to design, develop, engineer and manufacture . . . to the highest standards of excellence . . . units to meet your special needs in marking and coding equipment. Full information and recommendations for your requirements will be sent on request. ***Write for catalog.*** *Department WI*

Industrial Marking Equipment COMPANY, INC.

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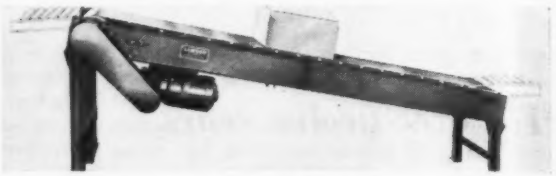
NEW EQUIPMENT . . . Begins on page 114

61

Made for inclined conveying



A complete package in itself, this unit booster can be incorporated into an engineered conveyor system or can be installed for special purpose jobs. For normal package conveyor loads, it can be used for inclines up to 30 deg. Boosters are made of a 5-ft. drive and a 5-ft. take-up section, that may be joined together to make a 10-ft. unit. Intermediate sections will extend booster to 60-ft. *Circle key number on rip-out postcard for further details.* Lamson Corp.

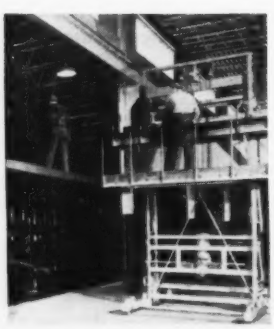
62

An ultimate in fork lift trucks

HiDuty 400 includes these features: high quality, standard component parts; power steering; higher free lift; easier service and maintenance; operator comfort. Pneumatic tires give maximum traction to realize full power from 55 hp jeep engine. 10-ft. of stacking height with a "mast collapsed" height of only 83-in. permits double and triple stacking in low overhead conditions. *For complete details, circle key number on rip-out postcard.* Transitier Truck Co.

63

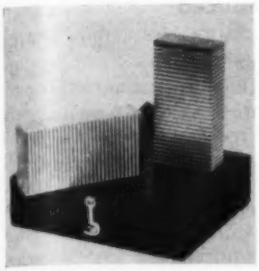
New elevator for bin loading



A portable electric-powered bin-loading elevator is a new development for use in operations handling long, heavy material. Platform is equipped with working height runways on both sides to permit handling of stock with a minimum of manual lifting. Push button controls at floor level and on elevator platform operate an electric-motor-powered cable lifting mechanism. Safety controls prevent platform from falling in case of power failure. *For further information, circle key number on rip-out postcard.* West Bend Equipment Corp.

64

Magnet parallels with aluminum spacers



Aluminum strip spacers are used between lines in this improved permanent magnet parallel. Providing superior holding force when used on magnetic or electromagnetic chucks, small form tools or other work can be placed directly on these parallels. Support bars are not necessary. Price is claimed more than 50% under catalog as result of new manufacturing process. *For more complete information, circle key number on rip-out postcard.* Tagden Enterprises.

65

Retaining ring dispenser

A new dispenser for Waldes Truarc crescent and E-shaped retaining rings includes these advantages: It makes use of minimum parts requiring no adjustment or maintenance; dispensing operation is simple and may be performed by unskilled labor; same base may be used for most ring sizes—only bracket assembly must be changed to conform to size; rings extracted from dispenser may be mounted rapidly with a minimum of operator fatigue; *For more complete details, circle key number on rip-out postcard.* Waldes Kohinoor, Inc.

If you need POSITIVE PUMPING specify VIKING

THERE'S no guess work when you install Viking pumps for moving viscous or semi-viscous liquids. The priming and discharge action is positive and smooth flowing.

The Viking "gear within a gear" action and port design allows the material to readily enter the pump. The non-slip action of the gears forces the liquid out in steady volume.

Investigate today, the smooth, even flow of Vikings handling either viscous or thin liquids. To start, ask for bulletin 54SA.

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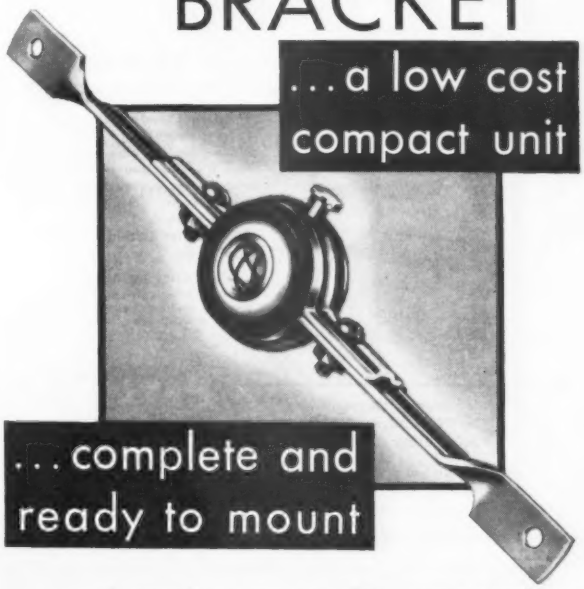
NEW Randall BEARING BRACKET



A sturdy, compact, 10-gauge steel bracket bearing, furnished completely assembled ready to mount, or knocked down, as desired. It features the RANDALL "Deep Well" graphited ball assembly contained in a spherical rubber cushion to assure maximum absorption of vibration, quiet operation, and constant controlled self-alignment.

This bracket retains all the outstanding qualities that the name RANDALL implies —sturdy, low cost, quiet operation, easy installation, constant self-alignment, double lubrication, and long life. Furnished in standard shaft sizes, 5/8", 3/4", 15/16", and 1" inclusive. Shaft sizes 1/2", 13/16" and 7/8" can be furnished on special orders in production quantities.

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Available for quick delivery from local stocks.

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Magnesium Strong!
Magnesium Safe!

Write today for your copy of Magliner Bulletin DB-204

Have you considered the advantages of equipping your docks with Magliner magnesium dock boards? Are you aware of the many benefits awaiting you? *Reduced loading costs! Easier handling! Greater speed and efficiency in shipping-receiving operations!* In the case illustrated above, the manufacturer took positive steps to insure against the penalty of loading bottlenecks . . . he investigated and installed Magliner magnesium dock boards! What about you? It costs nothing to get the facts! It can keep you steps ahead of the competition!

MAGLINE, INC.

P.O. BOX 402, PINCONNING, MICHIGAN

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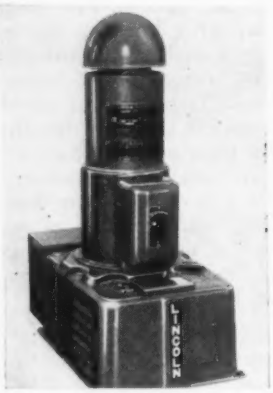
NEW EQUIPMENT . . . Begins on page 114

66

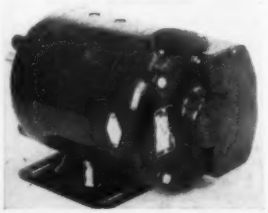
Battery charger line introduced



A line of battery chargers is a new addition to Lincoln's manufacture of arc welding equipment. Precision-Charge line is introduced with a charger for Edison industrial truck batteries. Three models are available to cover charging requirements for batteries of 10 to 42 cells. Correct charging rate for any battery is set with a single current control. *For folder of specifications on each model circle key number on rip-out postcard.* The Lincoln Electric Co. 1338

67

You'll approve these improved motors



An enlarged terminal box and improved brush mounting are new features of General Electric's line of 60 and 70 frame D-C motors. Suitable for general purpose, constant speed applications, these motors also may be operated at various speeds by derating, or re-connected for operation as a shunt motor, self or separately excited. They come in 1725, 1140, or 860 rpm. *For more complete information, circle key number on rip-out postcard.* General Electric Co.

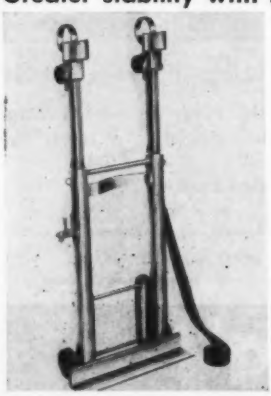
68

Glass-lined water heaters hot stuff

Rheem Mfg. Co. is adding glass-lined models to its present lines of copper tank and galvanized-steel water heaters. *For information on these new heaters, circle key number on rip-out postcard.*

69

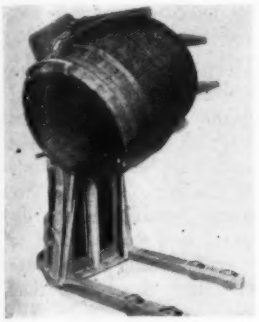
Greater stability with new appliance mover



This feather-light, all-magnesium appliance handling truck features wheels on outside of side rails for greater stability. Its "endless-belt stair climber" consists of 13 free-rolling rollers with an endless belt correctly located to prevent truck frame from contacting or marring steps. *For additional information circle key number on rip-out postcard.* The American Pulley Co.

70

Dump your barrels the new improved way



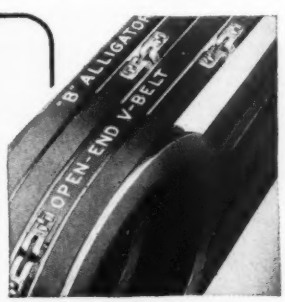
This barrel dumper has a lift capacity of 1800 lbs. with maximum lift height of 4-ft. Chain clamp on side of unit is adjustable to specific height of barrel. Walkie-type design affords minimum turning radius and allows truck close to vat or hopper receiving dumped material. Truck stability is offered in manufacturer's four-point load suspension. *For complete details, circle key number on rip-out postcard.* The Moto-Truc Co.

71

Hose design comes through

A new light-weight hose said to withstand sharp bends without kinking and not collapse under partial vacuum of rapid discharge is a new development for use in unloading of gasoline, industrial lubricants, and drawing and cutting oils from delivery trucks to service stations and industrial plants. Called Hewlite Tank Wagon Hose, it features an oil resisting rubber tube and cover, and spiraled wire reinforcement. *Circle key number on rip-out postcard for further information.* Hewitt-Robbins, Inc.

WHICH V-BELT *is best for you?*



If the correct size of endless V-Belt is not readily available, or if you have to tear down machinery to install, then the best belt to use is open-end V-Belting fastened with

ALLIGATOR **V-BELT FASTENERS**

★ In this way you can make up V-Belts in *any length* to fit *any drive* the fast economical way—V-Belts that perform exceptionally well.

★ In contrast to link-type belts these ALLIGATOR fastened V-Belts have just *one* strong joint . . . *stretch and follow-up maintenance are reduced to a minimum.*

ALLIGATOR **INTRODUCTORY V-BELT DRIVE UNITS**

contain V-Belting, Fasteners and Tools —everything you need in one compact package to make up V-Belts quickly. Available in sizes A. B, C & D.

Ask for Bulletins V-215 and V-216
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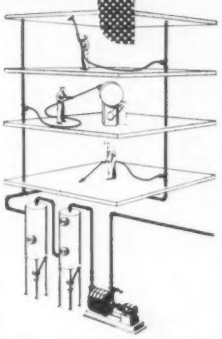
LET HOFFMAN HANDLE THE CLEANING CHORES



Those ever-present problems of cleaning and dust removal—HOFFMAN can be the answer!

Whether it's a heavy-duty portable unit on the scene, or an engineered built-in installation serving all the areas and all kinds of surfaces in your plant, Hoffman industrial vacuum cleaning equipment does a *complete* job of catching every kind of dust — and transports it away from your premises, *for keeps.*

Hoffman engineers will gladly survey your dust situation, get figures on the nature, volume, and any special factors in your case . . . and they can show you the most effective and economical answer. No obligation of any kind —write or call our agent nearest your plant.

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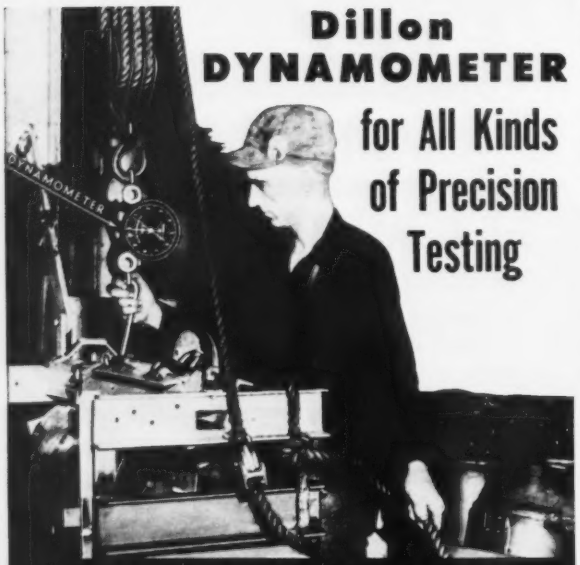

Dillon DYNAMOMETER for All Kinds of Precision Testing

Instantly reads tensile loads applied through hoists, turnbuckles, air pistons, etc. View above shows worker checking strength of welded lugs on bomb racks. Provides valuable test data on machinery or bulky items that cannot be checked in conventional laboratory setup. 13 different capacities from as low as 0-500 lbs. up to 0-100,000 lbs. Portable, light in weight, low in cost. Thousands in use. WRITE FOR PROFUSELY ILLUSTRATED CATALOG AND FREE TENSILE STRENGTH COMPUTER.

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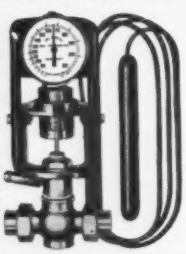
Cut Cost of METAL FINISHING With POWERS NEW Temperature REGULATOR



For Plating, Anodizing, Bonderizing, Pickling, Cleaning, Rinsing, and Chromate Dips. Powers No. 11-MF Regulators will help you get the most effective use from various solutions by holding them at the right temperature automatically.

Plastic Covered Thermal Bulb and Tubing—is highly resistant to solutions in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer—indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures. (b51)

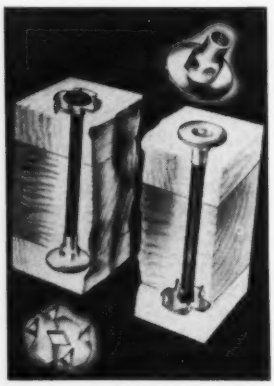
Bulletin 330 describes this simple, dependable control.

THE POWERS REGULATOR CO., SKOKIE, ILL.
Offices in over 50 Cities, see your Phone Book • Established in 1891

NEW EQUIPMENT . . . Begins on page 114

72

Heavy-duty pallet nut and torque washer combo



New Ace Kwik nuts are a combination nut and washer fastener specially designed for high speed industrial wood applications. Only one drilling operation. Ace torque washers are designed and constructed to prevent turning of carriage bolt in any operation. Prongs are deeply embedded in wood. For use in pallets, pallet bins, skids, crates, boxes, etc. *Circle key number on rip-out postcard for engineering bulletin.* Frank L. Robinson Co.

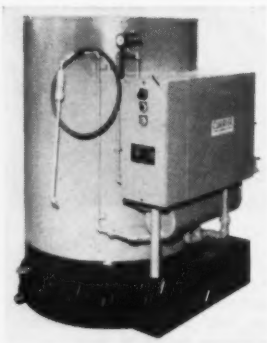
73

Better melt at less cost

Do you want reduced cost in operation and maintenance and more efficient melting with less line surging? These are major benefits promised electric furnace users in steel plants, foundries, smelters and other fields with this new, simplified arc furnace control. *For technical material and detailed information, circle key number on rip-out postcard.* Whiting Corp.

74

For efficient, safe degreasing



Currier DM-36 vapor degreaser, with pneumatic leak-proof slush system and round tank, comes completely equipped with modern controls and safety devices. Time for replenishing slush charge is claimed to be only 15 seconds, time to reach operating condition — 20 min. Machine's work-load capacity is 1200 lbs. hourly. *For sheet of detailed specifications, circle key number on rip-out postcard.* Currier Co. A-4.

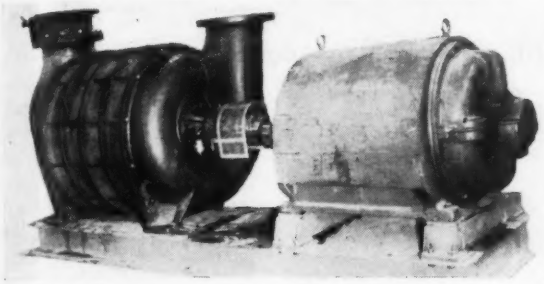
75

Increases capacity of baggage hand-trucks

Of tubular steel construction, this new rack will increase baggage hand-truck carrying capacity. When folded against face of truck, rack does not interfere with normal usage. Rack can be installed on most existing hand-trucks. *For more details, circle key number on rip-out postcard.* Colson Corp.

76

Production blower has custom adaptability



This new large-volume standard production centrifugal blower features adaptability. Using a combination of three newly developed interchangeable impellers, its No. 386 frame unit can be factory assembled to deliver any air volume between 2,000 and 9,000 cfm., with pressures ranging from 1 to 9 lbs. Units can be equipped with impellers that import a non-overloading characteristic. *Circle key number on rip-out postcard for additional information.* U.S. Hoffman Machinery Corp.

77

Silicone fluid compatible with organic materials

Dow Corning 555 Fluid is water white, odorless and easily diluted with such materials as lanolin, beeswax, mineral oil and 95% ethanol. Fluid shows promise as a release agent for specialized applications, such as an additive for paints and petroleum products, and as a plasticizer for certain rubbers, resins and plastics. *Circle key number on rip-out postcard.* Dow Corning Corp.

FOR FAST, ECONOMICAL PARTS CLEANING

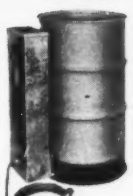
DRUM MAJOR VAPOR DEGREASER

Built for heavy-duty use, Drum Major *portable* degreasers clean up to 400 pounds of machinery parts per hour. Grease and scum are completely removed.

You will save time and labor with Drum Major, too. Just "plug in" near work area. Drum Major's heavily *galvanized* drum and condenser assure long, trouble-free service.

Moderate price includes work basket (on 55-gallon type only) and delivery allowance. Solvent spray degreaser available at extra cost.

Write for Currier Degreaser Bulletin.



Model "W" (55-gallon drum) available with water condenser or electric controls. (shown above)

Also available in 15-gallon **"Majorette"** size for extra-low-cost operation.

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Made only by

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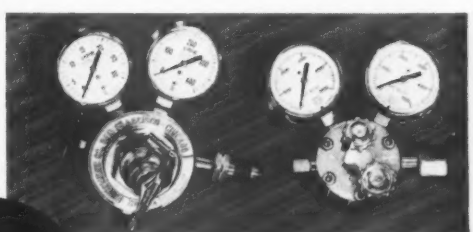

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6

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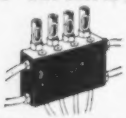
4 How centralized lubrication can increase bearing life, save you maintenance costs and increase production.

These are facts that can save you thousands of dollars! A Farval engineer is ready to serve you promptly. This is a Free Survey—no obligation. Write today!



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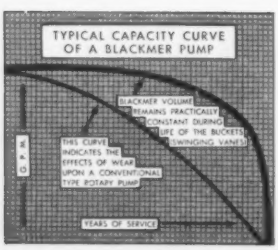
TYPICAL CAPACITY CURVE OF A BLACKMER PUMP
BLACKMER VOLUME REMAINS PRACTICALLY CONSTANT DURING LIFE OF THE BUCKETS (SWINGING VANES)
THIS CURVE INDICATES THE EFFECTS OF WEAR UPON A CONVENTIONAL TYPE ROTARY PUMP
RATED
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BLACKMER DESIGN *means low pumping costs . . .*

1. Blackmer's swinging and sliding vane principle assures maximum efficiency, positive priming characteristics, and continuing high rate of delivery. Metallic or composition vanes which are self adjusting for wear insure peak performance through years of hard use. When the vanes finally wear, it is easy to replace them and restore the pump to normal capacity in a matter of minutes.
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5. Pumps are available with speed reduction equipment for operation by all types of power drives (Motors, Engines, Turbines, etc.)
6. Blackmer rotary pumps supply the answer to a wide range of LIQUID MATERIALS HANDLING problems involving delivery to 1500 GPM — viscosities through 100,000 SSU — discharge pressures through 150 PSI — temperatures to 600°F.

liquid materials handling

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78

Fittings fittingly packaged

A line of forged steel fittings is now being packaged in cardboard cartons to protect external threads from damage during shipment or in storage. Packaged parts include hex head plugs and bushings, square head plugs and round head plugs in sizes 1/8-in. to 2-in. Plus assuring complete protection, cartons can be stacked in storage bins with labels facing outward for quick identification. *For more details on package-deal, circle key number on rip-out postcard.* H. K. Porter Co., Inc.

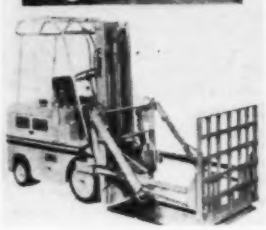
79

Restrictions off overhead copper

Hy-Therm Copper conductors, formerly limited in supply, are now available to all purchasers. Product finds wide application in bare and weatherproof conductors used in overhead transmission and distribution because of greater permissible thermal rating. It is said to permit higher current-carrying capacity and longer useful life under load, with no loss in conductivity. *For more complete details circle key number on rip-out postcard.* Anaconda Wire & Cable Co.

80

Redesigned Pul-Pac and Pusher units



Pul-Pac is a combination push-pull attachment permitting use of a thin carrying sheet instead of conventional type wooden pallet. Pusher device, with no gripper jaw on its rack, eliminates manual unloading of cartons, bags, drums or other material stored on pallets. Increased efficiency, enlarged capacity and easier, less frequent maintenance are said to be features of these redesigned units. *Circle key number on rip-out postcard for more info.* Clark Equipment Co.

81

Functional tristand for tough usage

New Ridgid 40A tristand pipe vise is made with an efficient new built-in folding tool tray that eliminates all loose parts. This stout tray pushes down flat for easy set-up and extra rigidity of vise stand. It pushes up easily to fold in and chain legs for easy carrying. Full-size base overhangs front legs to give clearance for threader handles. *Circle key number on rip-out postcard for specifications.* The Ridge Tool Co.

82

Advanced shovel crane control system combats cost

New LS-98 offers a new concept in one-yd. shovel-crane application. It is an answer to demands from contractors and industrial users for a machine to combat rising costs, increasing competition, and shrinking profit margins. This speeder bridges gap between application and portability advantages of machines up to ¾-yd. size and output advantage of larger, heavier sizes. *For descriptive booklets, circle key number on rip-out postcard.* Link-Belt Speeder Corp.

83

A solution to evaporative cooler problems

Far-Air rotary cooler is designed to filter, cool, humidify, ventilate and circulate. Odors and excessive salt buildup, expensive and frequent service calls, and corrosion damage to equipment and ductwork can be whipped by its installation. Simply use housing, motor and blower on existing cooler, omit spraying equipment, and replace pads with this automatic cooler. *For literature and free engineering details, circle key number on rip-out postcard.* Farr Co.

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Penflexweld, the corrugated, all-metal welded tubing is flexible . . . resists bursting, crushing, breaking . . . is heat and flame-resistant . . . is "seep proof" . . . absorbs vibration. Have you a job for it?

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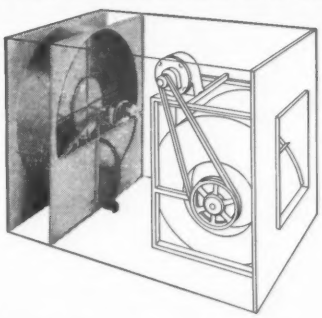
HEART OF INDUSTRY'S LIFE LINES

EVAPORATIVE COOLING PROBLEMS LIKE THESE —

- *Dissatisfaction with odors and salt buildup*
- *Expensive, frequent service calls*
- *Excessive corrosive damage*

HERE'S THE SENSIBLE SOLUTION



Use your present motor and blower, omit the spraying equipment — just replace the pads with an automatic

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- Easily installed in practically any system
- Delivers cooler, cleaner air at less cost
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- Filters—Cools—Humidifies—Ventilates—Circulates

This practical, low-cost conversion gives you the undeniable advantages of proven Far-Air cooling even though you now own another type of cooler. The simple addition of a Far-Air Rotary Cooler in your present system will give you superior cooling at a price far below the cost of a new complete unit. For details and a free engineering survey—

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☐ Engineer for free survey
☐ Literature and prices

Name _____

Address _____

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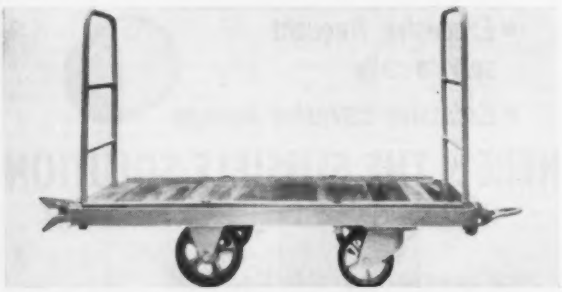
84

Protects truck loading docks

Here is a practical, low-cost solution to problem of damaged wood facing board. This new shock-absorbing bumper, mounted in continuous strips along a dock, is said to eliminate scraping and gouging, and prevent cracking from all but most severe collisions. It lowers maintenance for fleet owners by protecting paint at points of contact and guarding against rust-inducing dents. Bumper is made of neoprene synthetic rubber to assure long life under a broad range of rugged service conditions. *Circle key number on rip-out postcard for more information.* E. I. du Pont de Nemours & Co.

85

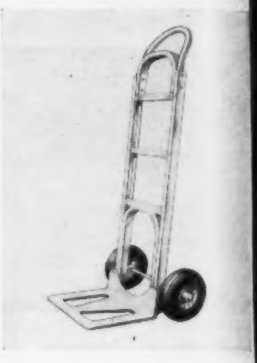
Makes Materials Handling more efficient



American Industrial Trailer model No. 4000 comes with casters especially designed for use on trailers performing heavy service and automatic couplers said to make handling more efficient by reducing time necessary to hitch warehouse trailers. Equipped with either rubber or steel wheels, trailer's standard platform size is 36-in. by 72-in., capacity 4,000 lbs. *For specification sheet, circle key number on rip-out postcard.* American Trailer & Mfg. Co.

86

A light-weight in magnesium hand trucks



Model No. 12-H-802 hand truck, rated to handle loads up to 450 lbs. safely and easily, weighs only 16 lbs. when equipped with rubber-tired magnesium wheels; 20 lbs. when equipped with standard semi-pneumatic tires. Truck incorporates a shovel-type nose unit, 12-in. long, and is designed for facility in moving bulky packages and cartons, and loads of irregular shape or size. *For additional information, circle key number on rip-out postcard.* Magline Inc.

87

More efficient overhead truck lifts

Made for grain, feed, and processing industries, two completely redesigned truck lifts have been developed to provide faster, safer, and more efficient truck unloading. Model No. 300 is rated for 8,000 lb., and model No. 500 is rated for 10,000 lb. cradle load capacity. They fit driveways from 10 to 15 ft. wide. *For six-page brochure, circle key number on rip-out postcard.* Screw Conveyor Corp.

88

For draining cellars and pits

Here are not one but two new automatic cellar drainers. Type DSM is driven by a 1/3 hp., 115 volt, 60 cycle, single phase Nema motor actuated by non-corrosive displacer bobs which are adjustable on a stainless steel wire. Type DSS is an entirely submersible unit with motor encased in a stainless steel shell. *Circle key number on ripout postcard for more details.* Aurora Pump Co.

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HELPFUL LITERATURE

89

Quaker bulletins describe spray and suction hose

A bulletin describing a specific hose for each type of spraying job includes a line of water hoses for nurserymen, fruit growers, florists, etc., and various kinds of paint spray hoses. A second bulletin presents suction hose for use in mines, quarries, construction jobs, pumping, trench and road-building. Both publications are well illustrated by cross-section and cut-away photos. Information is presented on construction, sizes, weights, working pressures, and recommended uses. *H. K. Porter Co., Inc.*

90

On installation of standby electric plants and controls

This technical bulletin covers installation of emergency standby electric generating plants and automatic line transfer controls. Intended "for the man who knows very little about the subject," bulletin covers technical matters in simple language. Descriptions of standby electric generating plants, methods of control, and easy-to-understand wiring diagrams are included in this 16-page booklet. Typical installations of both water-cooled and air-cooled Onan standby electric plants are pictured. *D. W. Onan & Sons, Inc.* T-011.

91

"The Case Against Secondary Boycotts"

Sections run as follows: In the public interest, unfair secondary boycotts must go; secondary boycott case histories; experts summarize boycott faults; boycott objectives are monopolistic; loopholes in Taft-Hartley boycott protection. *National Electrical Manufacturers Assn.*

92

"Weld Grinding and Blending with 3M Abrasives" . . .

. . . is a new 8-page booklet describing use of coated abrasive discs and belts for weld removal. It illustrates applications of 3M discs and several types of coated abrasive belts. Detailed diagrams and information are presented on two types of machines most widely used with abrasive belts —backstand unit, and swing grinder. Also shown are specialty items for weld grinding. *Minnesota Mining and Manufacturing Co.*

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93

Trouble shooter's guide to box stitcher maintenance

A new chart explaining and illustrating maintenance procedures for box stitching machines will show operators and maintenance men how to keep machines properly adjusted and track down causes of faulty stitches. Should be a valuable aid in preventing unnecessary downtime. Printed on heavy stock covered with a light plastic coating to protect it against dirt and grease, chart can be hung near stitching machines. *Acme Steel Co.* AD-154.

94

Selenium charger is described

This 4-page bulletin pictures and describes features of Yale selenium chargers designed for use with motorized electric hand trucks. Available for either lead, or nickel-alkaline type batteries, these chargers have no moving parts, thus providing dependable service without costly maintenance charges. *Yale & Towne Manufacturing Co.* P-1333.

95

Bulletin on UNB 2-stage centrifugal pumps

This specification sheet is graphically illustrated by a section drawing which points out such design features as oil-lubricated ball bearings; Worthington elastic seal rings; water-cooled, water-sealed stuffing box. Dimension charts and table giving materials of construction are included. *Worthington Corp.* W-318-S27.

96

Aluminum in the electrical industry

A new folder outlines Reynolds' expanded facilities for producing wire, cable, and bus conductor to meet ever-increasing demand for aluminum in electrical industry. Illustrations include cable reels and bus conductors. A run-down is given of company services. Helpful literature is listed on last page with list of branch offices. *Reynolds Metals Co.*

97

"Visual" plant layouts guide

This new 1954 catalog not only completely details "visual" equipment supplied, together with prices—but explains fully new system under which layouts can be purchased. That is, on progressive payment basis (minimum total order: $2,500)—wherein equipment is furnished immediately but billing is in 12 equal parts. *"Visual" Plant Layouts, Inc.*

HELPFUL LITERATURE

FOR THE PLANT OPERATOR WHO WANTS TO KEEP INFORMED

98

Tractor-trailer aisle widths discussed

Setting aisle-widths to take advantage of maximum floor area without interfering with materials handling is a consideration in these days of high cost per sq. ft. A discussion of "How Trailability Determines Tractor-Trailer Aisle Widths" is subject of this folder offered by *Mercury Manufacturing Co.*

99

Heating, ventilating and air conditioning brochures

Two 40-page guides, one on commercial and industrial heating and ventilating units, and one on air conditioning units, will help plant engineers plan, specify, and order proper units to solve almost any problem involving moving, heating, or cooling of air. Each publication is divided into five separate data sections: descriptive, performance, layout, engineering, and service. Performance data, curves, and charts included. *Westinghouse Electric Corp.*

100

Perforated steel sheets and plates

Newly published 4-page bulletin illustrates perforated patterns available for shipment from stock, and other patterns supplied perforated to order from carbon and stainless steel sheets and plates. How-to-order information along with typical layout covers all specification details. *Joseph T. Ryerson & Son, Inc.* 50-2

101

New directory out

The Los Angeles Chapter of Representatives, Inc., chapter of The Representatives of Electronic Products Manufacturers, Inc., issues its 8th directory with an extra roster insert for ready reference. Publication also contains a list of some 500 manufacturers represented and a product index with over 500 classifications and nearly 2,000 listings. Designed primarily for purchasing agents, government agencies, manufacturers, jobbers, industrialists, etc.

102

"In-Plane Bending Properties of Welding Elbows" . . .

. . . is a copy of ASME paper No. 53-A-70 presenting results of strain gage investigations conducted on relatively heavy wall WeldElls having a ratio of bend radius to nominal pipe size of $1\frac{1}{2}:1$. A comparison is made of results against theory. Design factors for WeldElls are established and tabulated. *Taylor Forge & Pipe Works.* 534.

Circle key number on rip-out card for literature you want.

103

West's growth reflected in steel-framed structures

A triple-folder contains numerous illustrations and valuable information on recently erected steel-framed structures in Northwest, Central California, Bay Area, Los Angeles, and Southern California. It illustrates numerous types of construction in which company's fabricated steel construction division has recently participated. Should be of particular interest to architects, structural engineers and contractors. *Bethlehem Pacific Coast Steel Corp.* 591.

104

"The West Coast . . . Its Industrial Potential"

Here is a 28-page brochure which highlights our West as a growing manufacturing area. Four major sections: market and growth, transportation, utilities, and labor, tell a pictorial and graphic story of advantages which new business and industry will receive by joining West's growing economy. Excellent presentation. *Kaiser Steel Corp.*

105

Specifications on a space cleaner

Here is brief, to-the-point info on new Baker Sterilshield space cleaner, a portable electrostatic dust collector that lowers dust, smoke, pollen, or bacteria content of air. Details of its talents are given plus price, dimensions, and a photograph. *Edward D. Maltby Co.*

106

About electric radiant heaters

Triple folder goes over 10 big advantages that they say you will get with Chromalox electric radiant heaters. Points are illustrated with application photographs and color diagrams. Testimonial letters are included. Specifications, controls, and prices turn up on last page. *Edwin L. Wiegand Co.* C 5604-A.

107

"Pacific Scientific News"

Here's another monthly publication that will be of interest to you. February issue includes notice of Pacific installing only primary balance in West for calibrating Rockwell Hardness testers. There is also an article on how company furnaces help produce sharper saws. *Pacific Scientific Co.*

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HELPFUL LITERATURE

108

"Flagg fittings featured"

This triple folder lists six outstanding features of Flagg line of standard and extra heavy, black and galvanized malleable fittings. Some fittings are pictured along with photographs of testing for alignment. *Thaler Pipe & Supply Co.*

109

On flexible stainless steel tubing

New bulletin fully describes this product, developed to convey a wide variety of searching and corrosive liquids and gases at high temperatures. Data on various types of construction, size and weight ranges, burst pressures, bending diameters, and fittings available for assemblies, is included. *The American Brass Co.* STC-1.

110

Guide to gas regulators

This new 36-page catalog fully describes Air Reduction's complete line of gas regulators. Cylinder, manifold, and pipeline regulators are illustrated with descriptions covering specifications and operating data. Each regulator has a chart showing types of gauges used with it, inlet and outlet connections, maximum flow cfh. and maximum working pressure psi. Flow and pressure charts are included. *Air Reduction Pacific Co.* 806.

111

Sixty-five years of leadership in light metals research . . .

. . . sets theme for a 54-page booklet, "Research at Alcoa." Featured is a useful and extensive bibliography of technical articles about aluminum. Section lists more than 1000 books, technical papers, and articles prepared by Alcoa research scientists in last 35 years. *Aluminum Company of America.*

Circle key number on rip-out card for literature you want.

112

How three different kinds of dusts can be controlled

Bulletin illustrates installation and relates how emery dust, dust from a rough grinding operation, and lint from a buffer are controlled by a standard Dustkop Dust Collector which was obtained from stock and installed by a small shop's maintenance man. *Aget-Detroit Co.* 640 No. 2.

113

Water treatment for cooling towers . . .

. . . is subject of this bulletin which discusses types of cooling systems together with such problems as corrosion of metal surfaces, inor-

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ganic scaling, organic growths such as algae and bacterial slime, and delignification of wood. Information on selecting chemical treatment is included with a table showing type and amount of treatment found to be effective under various operating conditions. *Allis-Chalmers Mfg. Co.* 28X7501A.

114

"Light of the West"

. . . is a guide to exactly which luminaires you need for highest efficiency and lowest maintenance costs in any given installation. Technical data is presented in charts, tables, and diagrams. Price sheet No. 25 included. *Fluorescent Fixtures of California.* AIA file No. 31-F-23.

115

Introducing Cleveland vibrator

Folder tells about a complete line of quiet, powerful electric vibrators to move, settle, and package stubborn materials. Diagrams present technical data on Models RC, MC-1.5, and MC-3 electric vibrators. Weight and price information is given. Extra sheet can be used in requesting information on vibrator and accessory mounting problems. *The Cleveland Vibrator Co.* 10.

116

Learn about radiomatic pyrometers

Four types of radiamatic radiation detectors for measuring temperatures from 125 to 7000F deg. F. are covered in this 28-page bulletin. Specifications are given for general purpose, small target, miniature, and low range radiamatic radiation detectors, their accessories, and electronic instruments and millivoltmeter pyrometers for use with these radiation detectors. Loaded with photographs, diagrams and charts. *Minneapolis-Honeywell Regulator Co.* 9301.

117

Get acquainted with this new electrode

Bulletin introduces new Wear-Arc "Super WH" electrode for welding manganese steel. Complete details on physical properties, applications, and welding procedures are presented. Well illustrated. *Alloy Rods Co.* AR-5.

118

Giant bolts line presented

This folder on a new line of giant Unbrako cap screws of heat-treated alloy steel gives net prices for diameters of 1⅛, 1¼, 1⅜, and 1½ in.

This Conveyor will serve you BETTER — LONGER!

Weld-Bilt STEEL-BELT CONVEYOR

Here's Why—

POSITIVE TRACKING—always runs in a straight line—no weaving, buckling, stretching, creeping.

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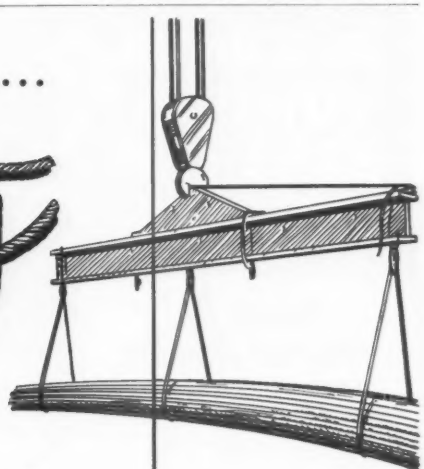

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HELPFUL LITERATURE

in lengths up to 12 in. Shipping weights on all sizes are listed. Cross-sectional pictures show strong, continuous flow of metal in a hot forged head as compared with weaker structure in head of a machined bolt. *Standard Pressed Steel Co.* 2002.

119

Laboratory services offered

Folder says that complete production units, as well as testing equipment, are available to you in Reitz laboratories. Company's disintegrators, prebreakers and thermascrews are units available to you on a rental basis for your own operation. Their descriptions are included. Photos of laboratory, machinery, and testing. *Rietz Manufacturing Co.* 200.

120

Maintenance guide for earthmoving equipment

This 24-page, four-color, cartoon-style booklet takes "Jim Jones," a county road commissioner, on a visit to a typical earthmoving contractor. He passes from one service specialist to another. Each tells Jones how to care for bulldozers, cable and hydraulic controls, pipelayers, rippers, scrapers, shovels, and wagons. Fine points of adjustment, lubrication are explained in more than 90 drawings. *Caterpillar Tractor Co.* D411.

121

All about two truck operations in one

Folder tells how trucks equipped with a Crescent hydraulic boom crane can now do double duty as both traveling crane and hauling truck. Features are presented along with diagrams of unit, its hydraulic system, and its operation. Standard boom crane data is given in table form. *Contract Manufacturers Corp.*

122

Guide to power transmission equipment

Here are 24 fact-packed pages of information on Lovejoy's variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmission. Diagrams, specifications, and tables of representative applications appear throughout. Sales offices are listed on final page. *Lovejoy Flexible Coupling Co.* 118.

123

Guide to pre-sealed insulated pipe

Here is data to assist architects, engineers, contractors, and draftsmen in designing, ordering, and installing Durant pre-sealed insulated pipe systems. Informative tables include: thermal expansion of pipe materials from 70 deg. F.; properties of saturated steam; and properties of steel pipe. Sections on specifications and installation and a page of ordering information wind up this booklet. *Durant Insulated Pipe Co.* 35.

124

Oil filters for heavy industry

Folder presents seven reasons for using Winslow filters. Explanatory text is accompanied by on-the-spot pictures of equipment in actual use. *Winslow Engineering Co.*

125

"Hot-Metal Magic"

Largely responsible for today's better steels are alloying metals. This 32-page booklet gives a glimpse into alloy-making industry and tells about everyday miracles that alloys are performing for us. Well written and illustrated throughout. A condensed list of Electromet alloys and their uses is presented on last page. *Union Carbide and Carbon Corp.* F-8369.

126

Price list for Coulter products

Both warehouse and forge division products are enumerated and priced in this black and yellow booklet. Notes on inside cover tell whom to call for sales and service, and metallurgical and engineering information. Company supplies steel ordered to Navy, Air Force, and Army specification. *Coulter Steel & Forge Co.*

127

On a system of centralized lubrication

Farval Dualine centralized lubrication systems are featured in this two-color, triple-folder. Center spread is devoted to application photos taken on-the-job in steel mills. Typical installations are listed. Valves and pumps are pictured and explained in text. *The Farval Corp.*

128

Saving ways in doorways

Here is a 32-pager that gives helpful information in comparing advantages of different styles of upward-acting types of doors, plus dimensional information necessary in plan-

WISCONSIN-POWERED HAISS CAR UNLOADER

Speeds Up Material Handling

This Haiss Model 501 combination chain- and belt-type Car Unloader, made by the George Haiss Mfg. Co. division of Pettibone Mulliken Corp., provides another typical example of a time- and cost-cutting Wisconsin Engine power application.

Wisconsin Heavy-Duty Air-Cooled Engines have the "engineered-in" Lugging Power that stays with the job. When sudden shock loads slow down the engine speed and the torque builds up, your Wisconsin Engine *hangs on* and pulls through without stalling. Heavy-duty engineered design and construction, plus trouble-free AIR-COOLING, are factors that keep the work moving on schedule at all seasons, in all climates.

You can't do better than to specify "Wisconsin Power" for your equipment. Available in 4-cycle single cylinder, 2- and 4-cylinder models, in a complete power range from 3 to 36 hp.

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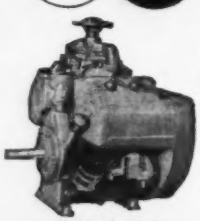

V-type 4-cylinder 15 to 36 hp.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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ning use of such doors. Products covered include steel rolling service doors. "Akbar" fir doors and shutters, Bifold, Rol-Top sectional, and special doors. Photographs and diagrams illustrate. *The Kinnear Manufacturing Co.* 79-AIA File No. 16-D.

129

The role of specially designed industrial trucks

Application of specially-designed industrial trucks where handling jobs cannot be mechanized in any other way, or where basic truck handling economies can be further increased, is subject of this new brochure. Literature contains over a dozen actual case histories describing how specially designed trucks solved specific problems. One section is devoted to drawings and explanatory text covering available attachments for use with fork trucks. *The Elwell-Parker Electric Co.*

130

New advantages for you in bulk materials handling

Folder on Hapman multiplane trolley conveyor with patented Stif-Arm bucket hangers gives full details in text, photographs, and diagrams. Special section gives mechanical features and specifications. Last page features picture of a typical, economical small plant application of a conveyor handling both stoker coal and ashes. *Hapman-Dutton Co.* MT-254.

Circle key number on rip-out card for literature you want.

131

"Successful brazing with Flagg Flow threadless bronze fittings"

This 48-page booklet is for men who put piping systems together. It gives basic facts needed in making silver-brazed joints. Contents include where and why silver-brazed fittings are used; what happens in a sound brazed joint; correct tools and materials etc. A section is devoted to brazing terms and what they mean. Illustrative diagrams throughout. *Stanley G. Flagg & Co., Inc.*

132

You too will be interested in . . .

. . . "Speed Gab," published every two months by *Reeves Pulley Co.*, for its representatives and employees. January-February, 1954, includes these subjects: transmission on washer-extractor; accurate speed control on welder; cut-off machine; motodrive maintains close tolerances, etc.

133

All about "Century" asbestos corrugated

This two-color folder presents info on a heavy duty roofing and siding material in cement gray color that they say never requires protective painting and is nearly maintenance-free. A table is included that gives standard lengths. Diagrams illustrate, and specifications are given. Application photos on final page. *Keasbey & Mattison Co.*

134

Ratchet-lever hoist bulletin

A new 8-page bulletin on Safety-Pull ratchet-lever hoists describes entire hoist line including both roller and coil-chain models, with capacities

"A" FRAME OR STEP LADDER Wide or narrow base
STURDY SCAFFOLD
one PORT A-FOLD makes them all!
"THE LADDER WITH A MILLION USES"
STRAIGHT LADDER
DESIGNED FOR INDUSTRY. Porta-Fold combines the service of two or three ladders into one compact unit. In a matter of seconds you can make an "A" frame or step ladder, a straight ladder or a sturdy scaffold from one unit. Constructed of ⅛" aluminum channel and hardwood, Porta-Fold is designed for heavy industrial service. Ideal for industrial maintenance and all factory needs. Extremely lightweight for easy carrying. Can be stored in less than one square foot of floor space.
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• May be applied in thickness 0.02" per coat, even on vertical surfaces, without running or sagging (unprecedented with rubber or synthetic rubber coatings) • Self-vulcanizing at room temperature • All the physical properties of vulcanized rubber: toughness, elasticity and strength • Superior to natural rubber in resistance to oils, fats and solvents • Inert to all acids (except highly oxidizing, such as nitric, chromic and sulphuric) • Okay with sulphuric below 50% concentration • Excellent in adhesion to steel, aluminum and bronze.

• DURO-PRENE's manufacturers, specialists in corrosion-resistant construction since 1912, and pioneers in many notable advances in that field, now have experienced, on-the-spot representatives, able to give engineering advice; also warehouse facilities, here in California • EL CHEM Service is *complete:* plans, materials and supervision of construction • Surveys, recommendations and estimates without obligation.

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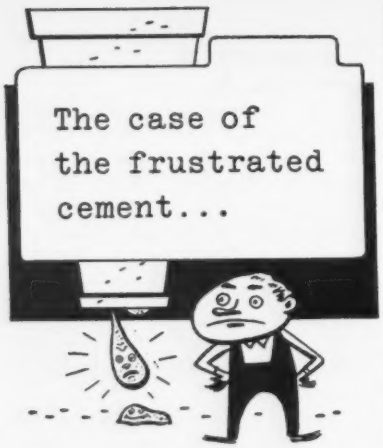
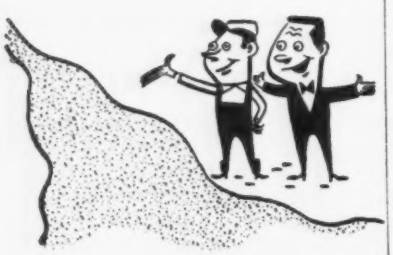


In a Chicago cement block plant a short time ago, production was really at a standstill. Try as it would, the frustrated cement just trickled through the hoppers and bins instead of flowing along steadily.

But a CLEVELAND vibrator solved the problem. In short order the trickle of cement increased to a flood.



And, we might add, production really got moving too.

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HELPFUL LITERATURE

ranging from ¾ to 15 tons. In addition to features, specifications, and special hooks, bulletin illustrates ratchet-pawl construction. Action pictures of various hoist uses complete information. *Coffing Hoist Co.* SP.

135

"IBM Overhead Cost Allocation"

A fast, automatic machine method of correctly distributing expenses among departments or cost centers is described in this new booklet. To distribute costs on a reciprocal basis, a set of simultaneous equations must be solved. These equations are illustrated and explained. A sample problem involving four departments demonstrates equation usage and gives step-by-step procedures for solution of two calculations which must be performed. *International Business Machine Corp.*

136

V-Belt guide issued

A new 8-page V-Belt catalog features BFG patented Grommet belts in standard and high capacity constructions. Cutaway drawings illustrate grommet construction, load-carrying cords concentrated in twin grommets. *B. F. Goodrich Co.*

137

Maintenance manual released

Here is a new, fully illustrated, 16-page manual on maintenance and repair of sugar mill equipment, agricultural implements, rolling stock, and machinery. Each case history presents a problem solved with soldering, brazing or welding materials and procedures. Every operational phase is illustrated with step-by-step pictures. Alloy used, recommended method, and, in many cases, savings effected, are described fully. *Eutectic Welding Alloys Corp.*

Circle key number on rip-out card for literature you want.

138

Makes order filling a one-man job

Bulletin is primarily concerned with Radox, a radio remote control which is Barrett's latest contribution to low-cost materials handling of organized volume shipping. Application photos supplement text. Remainder of bulletin is devoted to company's line of M-H equipment for large or small plant operations. There is a list of free literature on last page. *Barrett-Cravens Co.* 534.

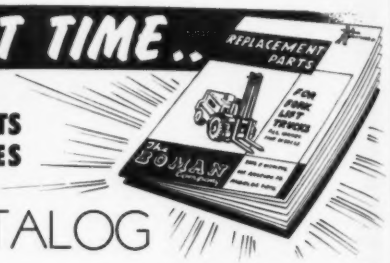
139

Brochure on chain saws

Emphasizing fourteen important design and operational features, this brochure illustrates Bolens Products division chain saw with 26-in. guide bar as well as 16-in. bow saw attach-

FOR THE FIRST TIME..

FORK LIFT TRUCK PARTS AT DISCOUNT PRICES



The BOMAN CATALOG

Here's great news for every owner of a fork lift truck! Now, for the first time, incorporated in one catalog are all the **replacement parts** for **Clark** and **Towmotor** fork lift trucks **at prices below factory list.** All parts manufactured by THE BOMAN COMPANY are precision engineered to the highest standards and tolerances.

Each item in the catalog is clearly illustrated and described in detail, so that you know exactly what you're ordering. With maintenance at an all time high, you'll save money by ordering your fork lift parts from THE BOMAN COMPANY. Write, wire or phone for your free catalog today.

We Rent, Sell and Service All Types of Fork Lift Trucks

The BOMAN *Company*

3316 East Olympic Blvd.
Los Angeles 23, Calif.
Angelus 3-2116

See our display and catalog in Booth #321, Western Plant Maintenance Show at Pan Pacific Auditorium, Los Angeles, July 13, 14, 15

ments. Other chain saw units available are listed. Company's engine replacement plan, affording worthwhile savings, is also described. *Food Machinery & Chemical Corp.* 550552.

140

Guide for choosing G-E ballasts

A four-page selection guide covering a complete line of fluorescent lamp ballasts is now available. Bulletin contains wiring diagrams for 24 fluorescent lamp ballasting circuits, cross-section dimensions, list prices, and electrical specifications for all types of G-E ballasts, including those for general line fluorescents, outdoor applications, germicidal fluorescents, rapid-start and circline lamps, and D-C operation. *General Electric Co.* GEC-983B

141

Tongue River Basin

Here is a study of a Wyoming area's resources, people, and economy. Main sections cover setting, present economic activity, and development possibilities. Appendix includes tables, electric power rates, City of Sheridan water rates, and chemical analyses of water. *College of Commerce and Industry, University of Wyoming.*

142

Info on cam clutches

A new 4-page, two-color, 8½ by 11-in. catalog describing Series 200 Morse cam clutches for indexing, over-running, and backstop machine drive applications is now available. Application data, typical installation drawings, and a complete table of specifications are given for seven models of clutches having torque ratings from 10 to 500 ft. lb. and ground OD dimensions corresponding to standard 200 series ball bearings in nominal sizes from 1½ to 3½-in. outside diameter. *Morse Chain Co.* C12-54.

143

Merchandising folder shows how to save money

This folder, composed of 20 case history field reports, demonstrates how Speedways Conveyors cut production overhead for industries using them. Each report states customer's name, type of business, materials handling operation required, and equipment installed to handle it. Precise cost of equipment installation is put up against dollar amount of manhours saved. *Speedways Conveyors, Inc.*

the multi-purpose lifting machine for the small shop

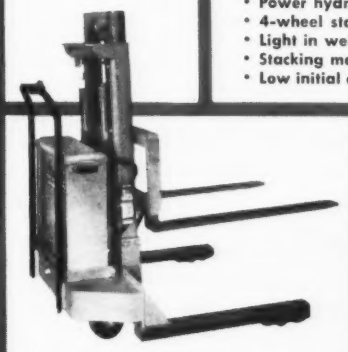
STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

LIFT TRUCKS INC. W. W. W. STUEBING CINCINNATI

Hydrolift Straddle Stacker

here are the FEATURES you want most in a mobile stacker

- Capacities to 2000 lbs.
- Power hydraulic telescopic lift.
- 4-wheel stability.
- Light in weight and highly maneuverable.
- Stacking made easy inside railroad cars or motor trucks.
- Low initial cost and upkeep.



The Hydrolift
fulfills the demand for an all-purpose hand truck in the average plant. It can be used for handling pallets, skids, dies, drums, barrels, sacked goods, and for numerous other non-routine jobs.

LIFT TRUCKS INC. 2423-2431 Spring Grove Avenue CINCINNATI 14, OHIO

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Gear making is a specialist's job. Johnson Gear standards are built around the ability to skillfully produce gears to exacting American Gear Manufacturers' Association specifications. The Johnson Gear organization has the technical "know how" and experience to build carefully and dependably a finished product that will give noteworthy performance.

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LA MESA, CALIFORNIA

HELPFUL LITERATURE

144

This packaged conveyor is for light duty

No. 460 continuous power conveyor is presented in a 16-page bulletin. Complete details in text are accompanied by how-it-works photos and diagrams. Standard curves are represented and data given. Basic pacakge is shown with a list of supplementary packages available. A list of available catalogs of company's equipment is included. *Richards-Wilcox Manufacturing Co.* A-96.

145

"Materials Handling Equipment Engineered to Meet Your Needs"

Several new products are described in this 48-page catalog. They include steel boxes with lap joints, a stand and reel for handling steel coils, and a new type nesting stacking box. Another new item offered is a skid box with a side door which provides easy access to materials without removing stacked boxes. Plenty of pictures. *Palmer-Shile Co.*

146

Brochure on Michigan air controls

A 12-page brochure, fully illustrated with pictures and drawings, explains simply and completely both theory and practical application of air controlled clutches which are standard equipment on all "Michigan" excavator-cranes. A series of cross-sectional sequence drawings illustrate operation of air control valve used in this system. *Clark Equipment Co.* 106.

147

"Denasco Fluid Power"

Fluid power equipment is covered so completely that only a brief rundown of this volume is here possible. Contents include info on general and engineering data, pumps and compressors, pump units, cylinders, motors, general valves, press and control valves, and accessories. Price lists, tables and illustrations included. *Ditzen Engineering & Sales Co.*

148

Transite-Pallite . . .

. . . is title of an illustrated folder containing up-to-date information on Transite core plates and slip jackets. It also presents company's newest asbestos product for foundry trade: Pallite plates and form driers developed especially for dielectric and electronic furnaces. Folder includes recommendations for use, performance characteristics and illustrations of materials in service. *Johns-Manville.* PP-31A.

149

Look into this portable cleaning unit

Here is a specification sheet on "Hoffco-Vac" No. 35 portable cleaning unit. It is pictured in use. Another picture illustrates how dust container can be easily removed. Unit is said to produce a suction of 6½ in. of mercury to operate on 1½ in. I.D. hose either 25, 50, or 75 ft. long at high vacuum. *U. S. Hoffman Machinery Corp.* A-982.

150

Brochure on material handling education

This booklet tells about problem of material handling, proposes a solution, outlines sound objectives, and spells out activities. It advises you of program ahead for College-Industry Committee on Material Handling Education. *American Material Handling Society.*

Announcing

NEW ASCO®
2-Way Solenoid Valve
for controlling the flow of Air, Gas, Light Oil, Water, Brine, Freon, Methyl Chloride, etc.
Pipe Sizes: ⅜" and ½"
Maximum Pressure: Air 200 psi

BULLETIN 8210-A
SOLENOID VALVE
(about ½ actual size)
Normally Open and
Normally Closed Types
Available

The most important development in years in compact design for 2-Way Solenoid Valves

featured by

- **Simplicity** — two operating parts: flexible diaphragm and stainless steel core
- **Long Life** — millions of maintenance-free operations
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- **Low Power Consumption** — only 10 watts
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who are ready to serve you.

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We design and manufacture a complete line of Solenoid Valves and Electromagnetic Controls including Automatic Transfer Switches, Remote Control Switches, Contactors, Relays, and Complete Control Panels.

Experience Shows "There's an ASCO Valve for Every Problem"

ASCO Solenoid VALVES

Automatic Switch Co.
385W LAKESIDE AVENUE · ORANGE, NEW JERSEY
Pacific Coast Factory Branch: 923 East Third Street, Los Angeles, Calif.

WESTERNERS AT WORK

CALIFORNIA

Union Oil Co.

Walter T. Jameson is appointed superintendent of Santa Maria refinery which this Los Angeles concern plans to build in San Luis Obispo county. He has been serving as assistant superintendent, operations department.

McCulloch Motors Corp.

Los Angeles firm names *Philip G. Patch*, formerly assistant to vice president in charge of production engineering, to position of manager, Lemery Distributors, Ltd., Vancouver, B. C.

Douglas Aircraft Co., Inc.

New vice presidents of Douglas Aircraft Co., Inc., Santa Monica, are: *A. M. Rochlen*, public relations director; and *K. G. Farrar*, general manager of concern's Long Beach division.

Westinghouse Electric Corp.

Walter J. Maytham, Pacific Coast regional manager, San Francisco, is elected a company vice president.

W. J. MAYTHAM
Westinghouse Electric Corp.

W. C. HALL
Pacific Coast Engineering Co.

Pacific Coast Engineering Co.

W. C. Hall, formerly vice president and general manager of Pacific Coast Engineering Co., San Francisco, is elected president and general manager to succeed *C. H. Ramsden*, newly elected chairman of board. *C. D. Ramsden*, chief engineer, is named vice president and chief engineer.

Pike Drilling Co.

Stanwood I. Williams is elected president of this Los Angeles drilling company. He replaces *Thomas P. Pike*, resigned to accept appointment as U. S. Assistant Secretary of Defense. *Gene Graham*, formerly vice president, will fill Mr. Williams' previous position of company executive vice president.

Pittsburgh Plate Glass Co.

Herschel E. Post is appointed general manager of Pittsburgh's Pacific Coast Paint division. He will headquarter in Torrance. Mr. Post comes from company's general offices in Pittsburgh, Pa.

Caterpillar Tractor Co.

D. Gonsalves is promoted from position of acting purchasing agent to that of purchasing agent at Caterpillar's San Leandro plant.

Linde Air Products Co.

This division of Union Carbide and Carbon Corp. appoints *L. W. Jordan* vice president of its Pacific region. Advancing from post of Pacific Coast region manager, he will headquarter in San Francisco.

American Potash & Chemical Corp.

George S. Wheaton, assistant vice president of American Potash, Los Angeles, is named head of company's Eston Chemicals division.

Nash-Kelvinator Corp.

Earl F. Warner, formerly factory manager, is appointed works manager of Nash Motors division, El Segundo, to replace *Campbell Wood*, who is on a leave of absence.

Dalmo Victor Co.

L. A. Casler is named a vice president of Dalmo Victor at San Carlos. He comes from Eureka Williams Corp., Bloomington, Ill., where he was executive vice president. *G. A. Henry* leaves Dalmo staff to become mechanical engineer, Equipment Engineering department, Stanford Research Institute.

Aerojet-General Corp.

General of the Army *Omar N. Bradley*, former chairman of Joint Chiefs of Staff, and Rear Admiral *Calvin M. Bolster*, ret., coordinator of development for The General Tire & Rubber Company (parent concern) and former Chief of Naval Research, have joined Aerojet-General's advisory board. Company is located in Azusa and Sacramento.

FORWARD!
by
LUBRIPLATE
LUBRICANTS

The introduction of LUBRIPLATE Lubricants established a new high standard for industrial lubrication. Now, a recently patented improvement in the production of LUBRIPLATE results in even greater lubrication efficiency. Under today's operating costs, reduction of down time, less parts wear and replacements, as well as lower power consumption, far outweigh any differential in the initial cost of LUBRIPLATE Lubricants.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for your free copy of the new and enlarged LUBRIPLATE DATA BOOK—a most valuable treatise on modern lubrication!

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N. J. • Toledo 5, Ohio

REVOLVATOR GO-GETTER Lift Efficiency

Door-to-Door Warehouse Handling Efficiency

For the efficient flow of goods within and without a plant — from production to storage — to shipping — there is no lift truck on the market today that surpasses the Revolvator Go-Getter line.

Illustrated above is the high lift model Go-Getter—a favorite of the food producers — accepted throughout all industry. In 2000-3000 lb. capacities —remarkably adept in narrow aisle work, the Revolvator Go-Getter high lift truck permits great economies in warehousing.

Write for the full facts today.

REVOLVATOR CO.
8798 Tonnele Ave., North Bergen, N. J.

WESTERNERS AT WORK

Atlas Powder Co.

Henry T. Clark, formerly manager of firm's Giant Works, Richmond, is promoted to post of manager of explosives production, Wilmington, Del. He is succeeded at Richmond by *Everett P. Taipale*, who comes from Atlas Works, Webb City, Mo.

Given Manufacturing Co.

Los Angeles manufacturer appoints *H. Robert Clark* its national service manager. He was previously chief design engineer for Boller and Chivens, Inc., South Pasadena.

Aborigine Lumber Co.

R. L. Shellenbarger is appointed general manager of Aborigine's Fort Bragg division. He was formerly superintendent of Ketchikan (Alaska) Spruce Mills.

Kelite Products, Inc.

Los Angeles concern names *William Sorensen* to post of executive vice president. He was formerly vice president in charge of firm's Atlantic division.

Stauffer Chemical Co.

Christian de Guigne is elected chairman of board, Stauffer Chemical, San Francisco. He is succeeded as company president by *Hans Stauffer*, formerly executive vice president and general manager. *John Stauffer*, vice president and secretary, takes on added responsibilities of chairman of new executive committee. *James W. Kettle*, formerly associated with U.S. Steel Corp., is elected controller.

H. STAUFFER C. de GUIGNE
Stauffer Chemical Co.

Johnston Pump Co.

H. Glen is elected president of Johnston Pump Co., Pasadena. Formerly president of Emsco Derrick & Equipment Co., he succeeds *Mrs. Thomas W. Simmons*, resigned.

Consolidated Engineering Corp.

Franklin H. Donnell is appointed vice president in charge of finance, Consolidated Engineering Corp., Pasadena. He has served as director and chairman of finance committee of concern's board of directors.

Hoffman Radio Corp.

Robert L. Unger is appointed director of industrial relations for concern's television division, with headquarters at Los Angeles. He was formerly employment manager of Hoffman Laboratories, Inc., a subsidiary.

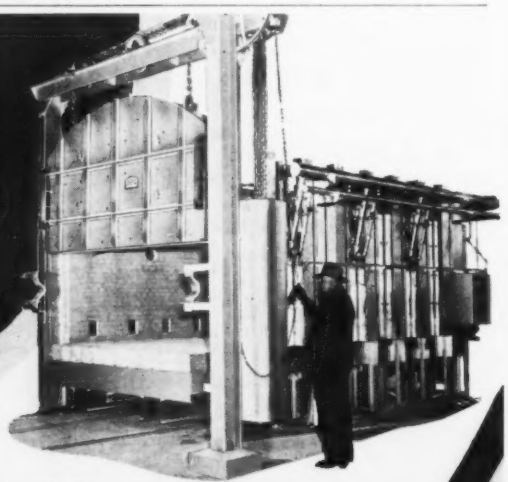
Holmes Eureka Lumber Co.

A. Westberg joins company at Eureka as resident manager. He succeeds *A. Quarnheim*, retired. *Edward Carlson*, formerly superintendent of California Fabricators, replaces Mr. Westberg as general manager at Eureka Lumber.

The Pacific Coast Co.

Concern elects following officials to office of vice president: *A. W. Agnew*, Sonoma, manager of plywood division; *T. P. Geoghegan*, Willits, manager of redwood division; *William A. Harding*, San Francisco, assistant to president; and *Donald R. Watts*, San Francisco, company secretary and treasurer.

Furnace Linings that STAND THE GAFF!



When you specify DFC HIFIRE BRICK for your industrial furnace you take a long stride toward longer service and lower maintenance. A high-heat-duty brick for gas, oil, or coal-fired furnaces.

- HIGH REFRACTORINESS
- EXCELLENT UNIFORMITY
- GOOD RESISTANCE TO SPALLING

Bulletin 801

PACIFIC STATES REPRESENTATIVE
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San Francisco & Portland

DFC
The DENVER FIRE CLAY Company
2301 BLAKE STREET • DENVER, COLORADO
SALT LAKE CITY • EL PASO • ALBUQUERQUE

Oliver Corp.

S. W. White, Jr., is named manager of this Chicago firm's new Western division which includes Be-Ge Manufacturing Co. of Gilroy. Oliver's recent acquisition.

General Petroleum Corp.

J. G. Schaafsma, formerly assistant to manager, becomes assistant manager for General Petroleum Corp.'s Laboratories department. He headquarters at Vernon.

Rockwell Manufacturing Co.

Terrence H. M. Taylor, former research scientist with U. S. Atomic Energy Commission, is named chief engineer of company's Nordstrom Valve division plant, Oakland.

U. S. Atomic Energy Commission

Harold A. Fidler is appointed manager of commission's San Francisco field office. Formerly deputy manager, he succeeds *John J. Flaherty*, named manager of Chicago operations office.

Johns-Manville Industrial Products Division

John H. Goodwin is appointed assistant San Francisco district manager.

Midwest Rubber Reclaiming Co.

Charles Emininger will be plant manager and *Lawrence Reinhardt* plant engineer at Midwest's new plant being installed at Paramount. They both come from East St. Louis, Ill.

Rohr Aircraft Corp.

Frederick H. Rohr, Jr., staff assistant to vice president of administration, is elected assistant vice president, Rohr Aircraft, Chula Vista.

Stanford Research Institute

Institute at Palo Alto promotes three members of its management staff. *Ralph A. Krause*, previously director of research, is named an associate director. *Merritt L. Kastens*, formerly assistant to director, is now assistant director. *John K. Shallenberger*, of Economics Research division, is appointed manager of Institute Relations, a new staff position.

COLORADO

Plasticrafts Inc.

John C. Rowley, Jr., is appointed production superintendent of Plasticrafts Inc., Denver. He was previously in charge of tool and die design, as well as product design and production, at Wallin Foster Associates of Denver.

IDAHO

U. S. Atomic Energy Commission

Allan C. Johnson succeeds *L. E. Johnston*, resigned, as manager of A.E.C.'s Idaho Operations office, Idaho Falls. Mr. Johnson was formerly director of division of Engineering and Construction, Idaho office.

NEVADA

Southern Nevada Telephone Co.

Harold G. O. Weiler is named vice president and general manager with headquarters in Las Vegas. He was previously with Washington State Public Service Commission.

OREGON

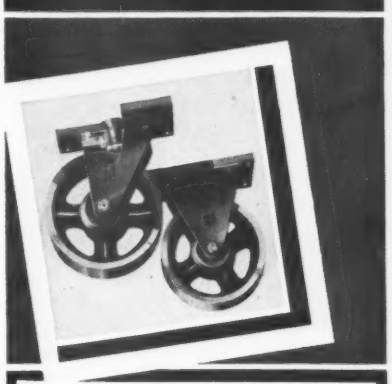
Consolidated Freightways

Arthur E. Nichols joins Consolidated Freightways as safety director. He comes from Willett Co., Chicago, Ill. Headquarters, Portland.

L. B. Morrison Lumber Co.

Oliver S. Bacon is named man-

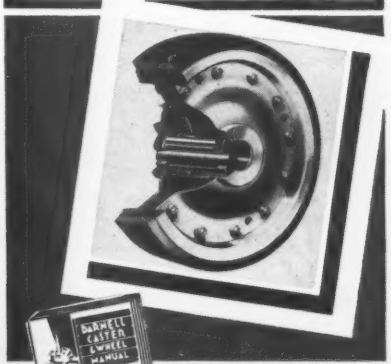
INDUSTRY'S BROADEST LINE OF
Casters & Wheels



Specify
DARNELL

The more than 4000 types of Darnell Casters and Wheels makes it easy for you to specify the exact model for your needs, that meets floor, load and materials handling requirements. Or, Darnell's wide experience in "custom-tailoring" casters for special equipment is at your disposal.

DARNELL CASTERS & WHEELS
Always
SWIVEL and ROLL



FREE
MANUAL

DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY), CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

ager of this Portland lumber company. He succeeds *Lee Burton Morrison*, deceased. Mr. Bacon was formerly associated with Ozette-Morrison Spruce Co., Anacortes, Wash.

UTAH

Vitro Uranium Co.

Richard C. Cole, formerly of American Smelting & Refining Co., joins this division of Vitro Corp. of America as plant manager, uranium ore refinery, Salt Lake City.

Mere payment of premiums does not insure

● It is easy to buy fire insurance but difficult to prove a loss.

When fire occurs *you* must be able to prove what you lost and its cash value.

With Continuous American Appraisal Service, you will always be prepared.

The AMERICAN APPRAISAL *Company*

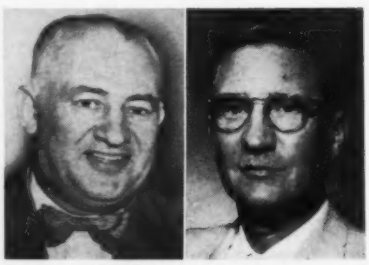
Over Fifty Years of Service

OFFICES IN PRINCIPAL CITIES

WASHINGTON

Western Red Cedar Assn.

R. M. Ingram, president of E. C. Miller Cedar Lumber Co., Aberdeen, is elected president of new organization formed by manufacturers to promote sales and wider use of products made from Western red cedar. Secretary-treasurer is *J. A. McCrory*, Seattle Cedar Lumber Manufacturing Co. Association headquarters, Seattle.



R. M. INGRAM
Western Red Cedar Assn.

J. D. STEVENS
Puget Sound Utilities Council

Puget Sound Utilities Council

Jack D. Stevens is newly employed consultant to council with offices in Seattle. He was previously associated with Bonneville Power Administration, where he was chief of power resources.

Bethlehem Pacific Coast Steel Corp.

Michael J. Hughes, Jr., is appointed to post of assistant metallurgical engineer, Seattle. He has been engaged in steel mill operations at Bethlehem's Seattle plant.

HIGH-PRESSURE TESTING

John BEAN

INDUSTRIAL PUMPS

High Pressure: 100 to 10,000 pounds per sq. in.

Low Volume: 1 to 80 gallons per minute.

16 standard, motor driven units completely equipped, ready to install. Special units designed for specific needs.

BEST BUY BEAN, built to last by the world's largest manufacturer of pumps.

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FOOD MACHINERY AND CHEMICAL CORPORATION

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STEEL PIPE
VALVES
CHAIN
TANKS
CASTINGS
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FITTINGS
PIPE LINES

The FAST, SURE, ECONOMICAL WAY!

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ASSOCIATIONS ELECT

Northwest Wood Products Clinic:

President, *H. R. Dix*, Anaconda Copper Mining Co., Bonner, Mont.; secretary-treasurer, *Everett Ellis*, University of Idaho, Moscow, Idaho.

American Institute of Industrial Engineers,

San Francisco-Oakland chapter: President, *Robert C. Sisco*, manager of production planning and control, Cutter Laboratories, Berkeley; vice president, *Thomas H. Martzloff*, associate, McKinsey & Co., San Francisco; secretary, *Robert L. Knighton*, senior industrial engineer, Columbia-Geneva Steel division, U. S. Steel Corp., Pittsburg, Calif.; treasurer, *William R. Morrison*, industrial engineer, United Air Lines, San Francisco.

American Society of Tool Engineers:

Secretary, *Wayne Ewing*, president of Arrowsmith Tool and Die Corp., Los Angeles.

Inland Empire Wooden Box Assn.:

President, *Owen C. Sawyer*, Peshastin Lumber & Box Co., Peshastin, Wash.; vice president, *Leonard Erickson*, Sunnyside, Wash.; secretary, *V. V. Keilig*, Wenatchee; treasurer, *Lynn Twitchell*, Cashmere.

Pacific Northwest Trade Assn.:

President, *Carvel C. Linden*, vice president, U. S. National Bank, Portland; vice president, *Howard N. Walters*, general sales manager, B. C. Electric Railway Co., Ltd., Vancouver, B. C.; treasurer, *Douglas D. Schindele*, C. P. A., Bostitch Northwest Co., Seattle; executive secretary, *D. C. Knapp*, Seattle; associate secretary, *Frank Wilson*, executive secretary, New Westminster Board of Trade, New Westminster, B. C.

Southern California Computing Machinery Group,

(New organization): Chairman, *Sibyl M. Rock*, ElectroData Corp., Pasadena; secretary, *Irving Lieberman*, Hughes Aircraft Co.; treasurer, *Paul Armer*, Rand Corp.

Cooling Tower Institute:

Vice-president, *Clayton E. Pickup*, The Fluor Corp., Ltd., Los Angeles.

Western Wood-Preserving Operators' Assn.:

President, *Paul D. Christerson*, Pope and Talbot, Inc., Portland; vice president, *M. R. Knudson*, J. Neils Lumber Co., Libby, Mont.; treasurer, *William A. Jackson*, Baxco Corp.; secretary, *James McGregor*, McCormick and Baxter Creosoting Co., Portland.

National Assn. of Corrosion Engineers:

President: *Aaron Wachter*, Shell Development Co., Emeryville, Calif.

American Steel Warehouse Assn.,

Northern California chapter: President, *E. G. Bergren*, sales manager of Tayler & Spotswood Co.; vice president, *Paul Childs*, Earle M. Jorgensen Co., Oakland; secretary, *Frank Quinn*, A. M. Castle & Co., San Francisco; treasurer, *S. W. Sloneker*, Hickinbotham Brothers, Ltd., Stockton; chapter director, *S. H. Diehl* of Foucar, Ray and Simon, San Francisco.

National Canners Assn.:

President, *Edward E. Willkie*, president of Pacific American Fisheries, Bellingham, Wash.

TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Price to represent Oakite

Richard J. Price is named technical service representative in Portland area for Oakite Products, Inc., New York, manufacturers of industrial cleaning materials. Earl M. Jahraus will continue to serve metal-working accounts in that area, and Mr. Price will take over food and other accounts.

R. J. PRICE
Oakite Products, Inc.

A. J. DILLON
Rucker Co.

Dillon Heads South Gate branch

A. J. Dillon is named manager of Rucker Co.'s South Gate, Calif., office and plant. He has been with company's Southern California sales staff for past six years, and before that spent ten years with Douglas Aircraft as flight inspector, hydraulic field engineer, and flight engineer.

Rucker Co. has recently added distributorship of Powermatic hydraulic pumps and rams, manufactured by Powermatic, Inc., of Akron, Ohio. Territory covered is six Western states, Alaska, and Hawaii.

New Link-Belt men

Link-Belt Co. appoints two new West Coast sales managers: Rodney F. Coltart for Central Pacific Division, with headquarters at company's San Francisco plant, and Benjamin M. Prestholt for Southern Pacific Division, headquartering at Los Angeles plant. Mr. Coltart, who started with Link-Belt in 1935, moves from post of sales engineer at Colmar, Pa., plant. Mr. Prestholt comes from company's Caldwell plant in Chicago, where his company service began in 1936. .

Open Seattle branch

Keller Tool-California, Inc. sets up new branch office in Seattle, headed by James A. Arney. Company, a subsidiary of Keller Tool Co., Grand Haven, Mich., has its headquarters in Los Angeles and a branch at Oakland.

Paulsen now in L. A.

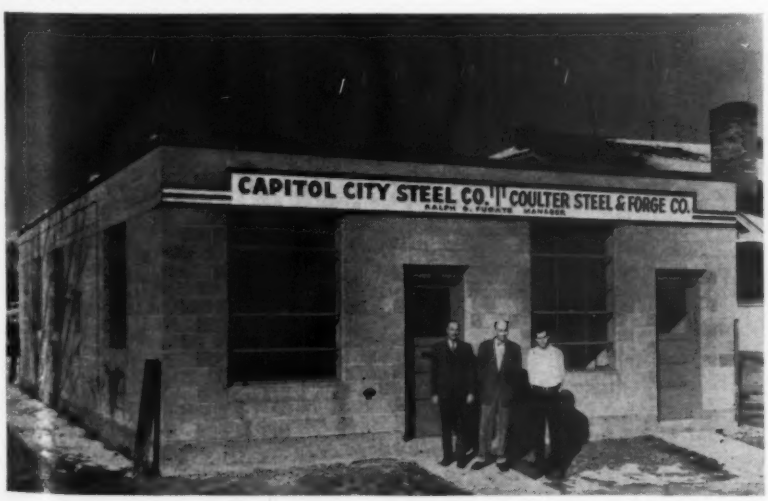
Lloyd Paulsen is named manager, Southern California area, of sales division for refactories products, Gladding, McBean & Co. He moves to Los Angeles from San Francisco, where he formerly held this post for Northern California area. George Lindahl is appointed to succeed him.

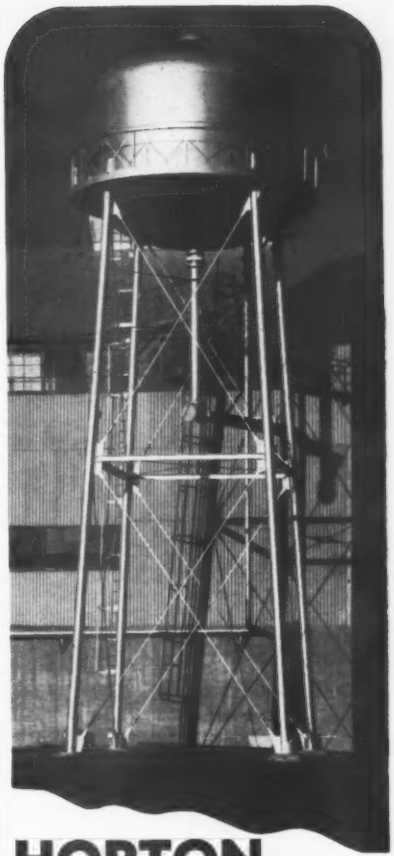
Foulger adds Clark lines

Foulger Equipment Co., Salt Lake City, is appointed by Clark Equipment Co. to sell and service its materials handling and construction equipment in state of Utah

Fugate heads new branch

Coulter Steel & Forge Co., Emeryville, Calif., opens Salt Lake Division office in Salt Lake City. President James V. Coulter (left) names Ralph G. Fugate (center) as manager of new division, which will handle what is reported to be first warehouse stock of alloy steel bars in Inter-Mountain area. It will also provide complete engineering service for forge products of Emeryville plant.





HORTON TANK Stores White Water at Newark, Cal.

The 25,000-gallon Horton® elevated tank shown above was installed at the Orangeburg Manufacturing Company plant, Newark, California. The tank stores white water used in a pulping operation at the plant.

Horton elevated tanks for storing water used in plant operations, for fire protection or domestic service are built in standard capacities from 15,000 to 500,000 gallons. Information, estimates or quotations on a Horton elevated tank for your plant may be obtained by writing our nearest office.

CHICAGO BRIDGE & IRON COMPANY

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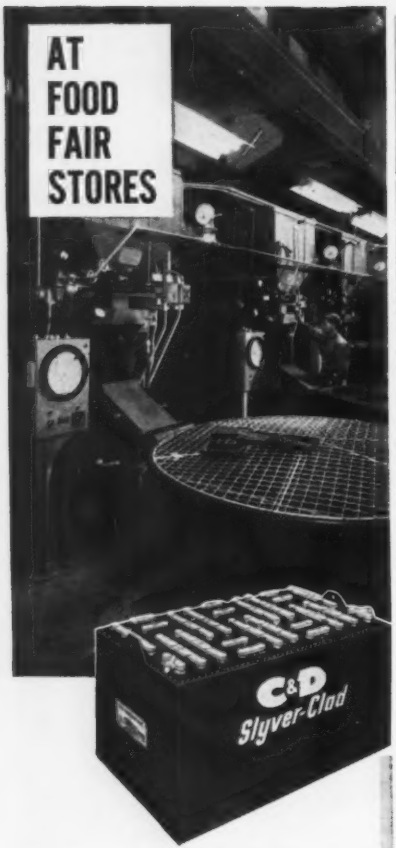
BOSTON 10	1065—201 Devonshire St.
CHICAGO 4	2132 McCormick Bldg.
CLEVELAND 15	2256 Midland Bldg.
DETROIT 26	1567 Lafayette Bldg.
HOUSTON 2	2164 C & I Life Bldg.
LOS ANGELES 17	1570 General Petroleum Bldg.
NEW YORK 6	3334—165 Broadway Bldg.
PHILADELPHIA 3	1666-1700 Walnut St. Bldg.
PITTSBURGH 19	3267 Alcoa Bldg.
SALT LAKE CITY 4	568 W. 17th South St.
SAN FRANCISCO 4	1578—200 Bush St.
SEATTLE 1	1369 Henry Bldg.
TULSA 3	1667 Hunt Bldg.



C&D BATTERIES
FOR EXTRA WORK!

Food Fair Stores, Inc., one of America's fastest growing food chains, is currently ringing up sales at the rate of $400,000,000 a year. To help handle the millions of pounds of dry groceries, meat, produce, and other products that move through the company's warehouses every week, Food Fair uses C&D Slyver-Clad* batteries as a major source of power in their industrial trucks. For Food Fair, like hundreds of other leading American companies has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for catalogs.

*TM Reg.

C&D
BATTERIES, INC.
of Conshohocken, Pa.

Manufacturers of Industrial Batteries since 1906
SALES AND SERVICE OFFICES
IN PRINCIPAL CITIES FROM COAST TO COAST

Headquarters for "Thinsteel"

The Cold Metal Products Co. of California will occupy this new building now under construction in Vail Field industrial tract of Los Angeles by George W. Carter Co., general contractors and developers of industrial projects. Building will contain about 70,000 sq. ft. of space for office and warehouse facilities, and when completed will represent an investment of over $500,000. Company distributes specialty strip steel products with "Thinsteel" trademark produced by the Cold Metal Products Co., Youngstown, Ohio, and has branches in San Francisco, San Diego and Seattle.

TRADE WINDS

and parts of Idaho and Wyoming. Foulger, established in 1946, recently moved into new headquarters with expanded shop area. President of company is Bert L. Foulger, vice president W. D. Archer, and sales manager J. A. Vetchell.

Philpott Co.

George M. Philpott Co., San Francisco, Oakland, and Sacramento, becomes Northern California factory representative of Miniature Precision Bearings, Inc., which has executive offices in Keene, N. H., and a West Coast plant at Santa Barbara, Calif.

In charge of Townsend sales

E. H. Stau is appointed Western division sales manager and William L. Nicolay assistant sales manager for Townsend Co., manufacturer of fasteners and rivets and cold headed parts. Their offices will be in Los Angeles. Mr. Stau will also continue to head aircraft sales for Townsend Co.

MILLER-ROBINSON CO.

HIGH FREQUENCY
INDUCTION PROCESSING

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Production—Tooling
Engineering—Equipment

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PLeasant 2-6141

Mr. Nicolay, who joined company in April 1953, was formerly with American Kitchen division of Ray Thomas Co. in Los Angeles as sales manager.

More tires for Spokane

B. F. Goodrich Co. moves into 4,000 sq. ft. warehouse in Spokane, which stocks tires, batteries and automotive supplies for company's Pacific Northwest district, covering northeastern Washington and parts of Idaho and Montana. Warehouse was formerly located in smaller quarters near company's retail store. New building is leased from T. A. Gallaugher.

Penoptic branch in West

Pennsylvania Optical Co., Reading, Pa., opens branch office and warehouse in San Francisco for sales and service on its industrial protective equipment for head and eyes. Manager of new Western division is Donald H. Long. Gorden E. Hadley will be Southern California representative, with headquarters in Los Angeles, and J. Robert Hottel representative in Northern California, working out of San Francisco.

New Lincoln Electric man

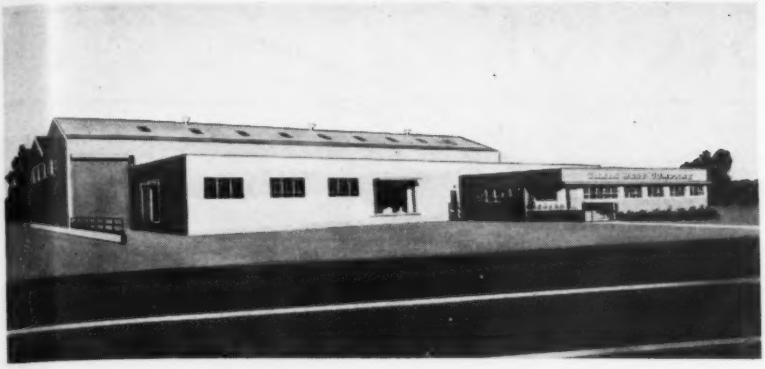
Donald Hastings is assigned as application engineer to Emeryville, Calif., district of Lincoln Electric Co., Cleveland.

New building for Denver firm

Regional Sales Co., Denver, moves into modern building. Firm, which is headed by Al Roth, handles products of Arro Expansion Bolt Co., Desmond-Stephan Co., M. H. Harper Co., and Lamson & Sessions.

Jones succeeds Larson

J. Roy Jones is appointed regional engineer of Westinghouse Lamp Division, with offices in Los Angeles. Earl F. Larson, who formerly held that post, has transferred to company's Electronic Tube Division in same city, as regional sales engineering representative. Mr. Jones has been with Lamp Division's commercial engineering department at Bloomfield, N. J., since 1947.



Chain Belt moves in Los Angeles

New building for Los Angeles branch of Chain Belt Co., Milwaukee, houses manufacturing plant, warehouse, and district sales office. The 41,000 sq. ft. plant, representing a total investment of over $500,000, will permit expansion of company's California operations. Company now manufactures Rex Moto-Mixers in Los Angeles, as well as accessories to conveyor and power transmission lines, and plans to add production of belt conveyor idlers. S. Y. Warner, Jr., is manager of Chain Belt's California operations.

Vive LaFrance!

Paul E. LaFrance is appointed manager of Los Angeles office of Baldwin-Lima-Hamilton Corp., Philadelphia, Pa. Mr. LaFrance has worked in aircraft and diesel engineering fields and from 1951-53 was a design engineer for Hiller Helicopters, Inc.

Eye national markets

Corona Manufacturing Corp., Glendale, Calif., is awarded license to manufacture Merco infra Pyrex tube heater in industrial

Signode expands in Portland

Signode Steel Strapping Co. occupies new warehouse at 1519 N. W. Irving St. in Portland.

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TRADE WINDS

oven field, developed by Merco Industries, Seattle. National sales program for Merco regional distributors is planned by Corona, under supervision of director of sales, Horace H. Wagner.

Harco Co. formed in Denver

New company specializing in sale of heavy construction and mining machinery is formed in Denver by G. R. Harris and A. Roy Wicker, with name of Harco. Firm will distribute equipment of Joy Manufacturing Co. and will sell wire cable, Ford tractors and other industrial supplies.

Warehouse for Butcher

L. H. Butcher Co., Portland distributor of industrial chemicals, will move into new warehouse built to company's specifications in Guilds Lake area. Building, to provide 20,000 sq. ft. floor space, will cost about $150,000.

Pyramid In Northern California

Don D. Fleming Co., Inc., San Francisco, is appointed distributor of Pyramid Steel Co. tool and die steels in Northern California and Nevada. Fleming will stock complete line of bar, shapes, and plate steel manufactured by the Cleveland company.

Mercury picks McKinley

McKinley Equipment Co. now represents Mercury Manufacturing Co. in Los Angeles area. Company, in addition to sales of Mercury equipment, will preform service work and stock spare parts. Mercury has its main office in Chicago.

To stock Bonney hand tools

Warren & Bailey Co., Los Angeles, adds complete stock of mechanics' hand tools manufactured by Bonney Forge & Tool Works of Allentown, Pa.

Moving

Edison Storage Battery Division of Thomas A. Edison, Inc., moves to 310 Ninth Ave. North in Seattle.

THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Western leadership in eastern fields

Two recent examples of Western leadership are the expansions of the Garrett Corporation and Norris-Thermador Corporation into Eastern fields with Western men in charge of the Eastern territory.

Garrett has assumed full ownership of Aero Engineering, Inc., of Akron, Ohio, Aero Sales Engineering Ltd. of Ottawa, Canada, and Air Cruisers Co. of Belmar, New Jersey. Frank W. Miles, vice-president and director of the Garrett Corporation, has been made vice-president in charge of the newly-acquired companies.

The sales organization of the 75-year-old electric range manufacturer, A. J. Lindeman and Hoverson Co. of Milwaukee, has been consolidated with that of the younger Thermador Electrical Manufacturing Co. and the staff of Norris-Thermador. Both the Milwaukee firm, which was acquired last year, and Thermador Electric, are subsidiaries of Norris-Thermador.

Output of all console electric ranges and water heaters at the Milwaukee plant will be under the Thermador trade name, and heading the combined sales force as general sales manager will be Frank A. Bellman, until recently vice-president in charge of sales for Thermador.

West's petroleum demand on the up

The rate at which demand for petroleum products in the Pacific Coast area is increasing and overtaking raw material supplies is pointed out in a study by the Federal Reserve Bank of San Francisco prepared by Wilfred Eldred.

In the three coast states, plus Arizona and Nevada, the demand for petroleum products in the domestic markets normally served by Pacific Coast refiners expanded by more than 26% between 1946 and 1953, rising from 839,000 barrels daily to over 1,060,000 in 1953.

Civilian consumption increased 27%, expanding from 761,000 barrels daily in 1946 to 967,000 barrels daily in 1953. Military demand averaged about 83,000 barrels daily over the eight years, reaching a postwar peak of 112,000 barrels daily in 1952.

In the same period the output of petroleum raw materials, consisting of crude oil, condensate, natural gasoline, and liquefied petroleum gases, only increased 18%, or from an average daily rate of 923,000 barrels in 1946 to 1,085,000 barrels per day in 1953.

Despite this shortage of raw materials, California simultaneously imports and exports oil. One of the reasons is that the Coast produces a large proportion of low gravity crude oil but has refining facilities much better adapted to high gravity crudes. Although existing facilities on the Coast are constantly being improved, it is difficult for the industry to meet the market demand for all crude products without supplementing local supplies of crude with some high gravity crudes or their equivalent obtained elsewhere.

The bank says it is too soon to appraise the possible effects upon Pacific Coast oil production that may occur in the future as a result of the transfer of offshore tidelands from the federal government states.

Expansion is greater

New industrial plants and expansions for Los Angeles County for the first four months of 1954 totaled $52,747,000, or 6% above last year, Security-First National Bank reports. Electric power used by Southern California industry reached an all-time high in April, 2% above April of 1953 and 1% above the previous peak established last July.

ARIZONA

NEW AIR CONDITIONER—Continental Manufacturing Co., Phoenix, begins commercial manufacture of air conditioning units that do not use water, after a reported 18 months of experimentation.

CHEESE FACTORY—Arizona Cheese and Cattle Co. of Scottsdale plans to locate cheese-manufacturing plant at Yuma, with capacity of 200 gal. of milk daily. Construction of a plant with five times that capacity is anticipated for future.

COLORADO

ENCOURAGEMENT—Secretary of Interior Douglas McKay tells Congress that experiments of Bureau of Mines' plant in Rifle indicate that a reasonable oil yield can be obtained from shale, and that improvement in plant operations will make venture economically sound.

URANIUM BONUSES—Atomic Energy Commission has made bonus payments in excess of $3,200,000 to uranium miners working Colorado Plateau, according to report of Sheldon Wimpfen, head of AEC's Grand Junction Operations office. Total of 2,099 payments have been made, applying to 437 properties. More than 550 mines were operated in area during 1953.

GOVERNMENT SELLS MILL—U. S. General Services Administration sells on bid mill, millsite, and equipment taken over from Boulder Tungsten Mines, Inc., upon its failure to fulfill a government contract. Buyer is Wah Chang Corp. of New York, headed by K. C. Lee, an American. Price of property, which is seven miles west of Boulder, was about $50,000.

CALIFORNIA

CONSOLIDATION—Wilgus Mfg. Co., Los Angeles, is consolidated into a manufacturing division and wholly-owned subsidiary of Natural Gas Equipment, Inc. Wilgus manufacturing machinery and personnel move to NGE's new Pasadena headquarters, which provides 60,000 sq. ft. of floor space

A section of the June 1954 issue of WESTERN INDUSTRY—609 Mission Street, San Francisco 5, Calif.

ALL STEARNS-ROGER—Stearns-Roger Manufacturing Co. moves into new building at 660 Bannock St., Denver. The 5-story air-conditioned building, which houses Denver force of about 500 persons, including executive officers, sales engineers, designers, draftsmen, and general office personnel, was designed and constructed by company engineers, in association with J. Roger Musick as consulting architect. O. J. Robbins of Stearns-Roger was project engineer supervising design and construction. Company, headed by Charles O. Voigt, builds plants for heavy industry and manufactures heavy equipment.

for manufacture of gas burners and industrial furnaces as well as sale of products for which company is West Coast distributor.

JETS AND ROCKETS—Ryan Aeronautical Co., San Diego, is producing Firebee jet target planes under U.S. Navy contract, with delivery scheduled to begin in late spring, for use as drones in anti-aircraft, aerial gunnery, and guided missile training program. Ryan is also making rocket motors for Corporal guided missle, on which Firestone Tire & Rubber Co. now holds prime contract.

NEW PLANT FOR UNIVERSAL METAL—Construction will begin by mid-June on new plant for Universal Metal Products, Inc., at Basset (Los Angeles County), to be occupied in 1955. Company recently opened a third plant in Alhambra and also completed installation of cold test chambers, high temperature test ovens, and other equipment.

CONTRACT ON TWIN CATS—Standard Oil Co. of Calif., San Francisco, awards to Bechtel Corp. contract for design and construction of twin catalytic reforming plants at its Richmond and El Segundo refineries. Plants, scheduled for operation in spring of 1955, are part of $30,000,000 refinery program undertaken by Standard Oil.

ADD 200 REFRIGERATOR CARS—Work on an additional 200 refrigerator cars will begin in September at Roseville shops of Pacific Fruit Express Co., jointly owned subsidiary of Union Pacific and Southern Pacific railroads. Cars, known as "Super Giants," are longer than conventional reefer cars, with insulation 50% thicker, and are designed for transport of frozen foods. All cars will be completed in spring of 1955 and will raise PFE's total of such cars to 337.

AIR FREIGHT MERGER — Flying Tiger Line and Slick Airways, both of Los Angeles, merge. Combined operation will employ 2,700 persons and operate 53 air freight planes, said to be world's largest air freight organization.

CITRUS PLANT CLOSES — Azusa Citrus Association plant at Azusa closes because of decreased acreage of oranges in area.

PARENT COMPANY MOVES WEST—Lear, Inc., manufacturer of electronic instruments, moves headquarters from Grand Rapids, Mich., to Santa Monica, where it will share plant with administrative departments of LearCal, a subsidiary. New 50,000 sq. ft. plant was designed by Pereira and Luckman, architects.

MAY BUILD POWER PLANTS—Monolith Portland Cement Co. of Los Angeles and Kaiser Steel Corp., Fontana, in hearings before California Public Utilities Commission, state they may each build their own steam generating power plant if Southern California Edison Co. receives rate increase it has applied for.

BUY ADJOINING LAND—Iron Mountain Corp. buys 265 acres of land bordering on its $1,000,000 copper chemicals manufacturing plant near Martinez, north of Oakland, at cost of approximately $158,000. Firm, a subsidiary of Mountain Copper Co., Ltd., of England, reportedly does not plan to build at this time.

REFINERY EXPANSION—Platforming unit, hydrotreater, and isomerization unit will be built within the next year for Wilmington, Calif., refinery of The Texas Co. C. F. Braun Co. of Alhambra will build platformer, which will have a rated charge capacity of 10,000 bbl. of gasoline daily. Isomerization unit will produce 1,000 bbl. of isobutane daily, and hydrotreater has a design capacity to treat 10,000 bbl. of cracked naphthas per day.

NEW PLYWOOD PLANT—Tri States Plywood Co., Olympia, Wash., will build $500,000 plant at Santa Clara, which reportedly will be first in area to manufacture plywood. Starting employment will be 75 persons, which is expected to double within a year.

BUY FIRM IN CANADA—McCulloch Motors Corp., Los Angeles, acquires Lemery Distributors, Ltd., a Canadian outlet for McCulloch products. Company has offices in Vancouver, Quebec City, and Peterboro, Ont.

MOVE AUTO ASSEMBLY—Production of Dodge and Plymouth passenger cars by Chrysler Corp.'s San Leandro plant will be consolidated by end of 1954 into company's Los Angeles plant, which also produces DeSoto and Chrysler cars. Parts production at San Leandro plant will not be moved, and defense work will continue until current contract is completed early next year. Expanded facilities are now being installed at Los Angeles, to include two new assembly lines, replacing former single line, and new body finishing operation. Assembly of passenger car bodies from stampings shipped from Detroit will also be added at Los Angeles.

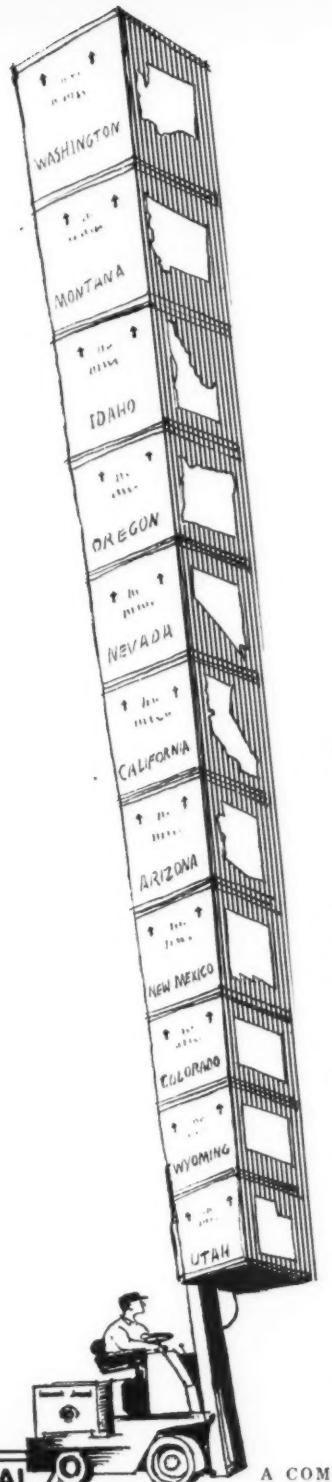
GIANT MILLING MACHINE—El Segundo Division of Douglas Aircraft Co., Inc., installs and begins operating 250-ton spar and skin milling machine built by Giddings and Lewis Machine Tool Co. of Fond du Lac, Wis. Machine, operated by two men in charge of control panel on overhead bridge, can machine entire sections of an airplane from aluminum plate 40 ft. long by 10 ft. wide. Machine is reportedly sensitive to tolerance of .0015 in. This double-duty mill is one of series of machines being acquired by Douglas El Segundo under Naval Industrial Reserve Aircraft Program begun over two years ago.

BUY FABRIFORM—Globe Corp. of Chicago acquires all physical assets of Fabriform Metal Products, Los Angeles, metal fabricating company. Same management will continue to operate plant.

MOVE TO VISTA—Raymond-Lindsey Co., electronics firm specializing in public address systems and amplifiers, will move plant from Gardena to new building in Vista, where company will employ 20 persons.

BUY SAN JOSE FIRM—Pittsburgh-Des Moines Steel Co., Santa Clara, acquires Proctor-James Steel Co., San Jose, for operation as steel warehouse jobbing division. Plans call for expanding steel inventory and later constructing new 30,000 sq. ft. warehouse. E. E. Proctor will manage new division.

TO BUILD WAREHOUSES—Plans to develop 31-acre tract of land north of Sacramento for use as light commercial and warehouse area are being carried



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Los Angeles District Office: 354 S. Spring St. Seattle District Office: 6625 White-Henry-Stuart Bldg.

MORE SPACE FOR AMERCOAT—Amercoat Corp., South Gate, Calif., manufacturer of protective coatings, occupies new executive offices and research laboratory built as wings to its South Gate plant. New buildings more than double size of research facilities. Company within the past year built new district offices and warehouse at both Houston, Tex., and Kenilworth, N. J.

out by Auburn A. Erickson of Erickson Construction Co., Sacramento; Joseph Blumenfeld; and William B. David, San Francisco architect, who recently became joint owners of tract. First project is construction of two grain warehouses to store about $4,000,000 worth of government surplus wheat. Work is now under way to blacktop a 300 x 500 ft. area for open storage of wheat until warehouses have been built by Erickson Construction Co.

AZUSA PLANT—Alvey-Ferguson Co., manufacturer of industrial conveyors and washing machines, opens new plant in Azusa. C. F. Butz is manager of West Coast company, which is staffed with key personnel from parent company's Cincinnati headquarters.

NEW LUMBER COMPANY—Codding Enterprises leases Santa Rosa Lumber Co. plant for use in lumber processing. New firm is named Empire Wood Products, and manager is Rudolph Groth.

POTATO CHIP PLANT—Bell Brand Foods, Ltd., opens $1,250,000 plant in Los Angeles for manufacture of potato chips, corn chips, peanut butter, shoestring potatoes, and other foods. The 70,000 sq. ft. single-story plant employs 250 persons.

IDAHO

NEW MACHINE—Boise Payette Lumber Co. plans to add hydraulic debarking machine to its mill in Emmett sometime before August. Machine, which will remove bark from logs before they are sawed, can handle 250,000 bd. ft. per 16-hr. day. Bark, previously burned as waste, will be used to fire boilers of company's mills at Emmett, Cascade, and Council, replacing present sawdust burners.

ENLARGE MILL—American Smelting & Refining Co. will build an addition to concentrator recently purchased at Vulcan mine west of Wallace, and install another ball mill and more flotation cells. Work is scheduled to be done this summer. Capacity of concentrator will be increased to 350 tons daily from 150 tons.

IDAHO DAMS—Board of Engineers for Rivers and Harbors approves construction by Corps of Engineers of two Clearwater River dams in Idaho (at Bruces Eddy and Penny Cliffs), which will cost an estimated $309,200,000. Approval is preliminary to Congressional authorization and appropriation of funds. Applications are now before Federal Power Commission for construction of dams at these sites by private power utilities.

TO DOUBLE OUTPUT—Second multimillion dollar electric furnace is under construction at Soda Springs phosphorus plant of Monsanto Chemical Co., for completion in November. Combined output of two furnaces will make Idaho branch of Monsanto the largest producer of elemental phosporus in West.

PUBLIC MAY USE ATOMIC REACTOR—Atomic Energy Commission makes available to public the facilities of Materials Testing Reactor operated for AEC by Phillips Petroleum Co. at Idaho Falls. MTR, which "burns" uranium to produce world's highest known nuclear radiation intensity, was developed for purpose of testing materials used in reactor construction. Now private research and industry can make use of experimental services, with charges based on costs involved. Applications should be filed with Isotopes Div., AEC, Oak Ridge, Tenn.; and questions relating to irradiation services should be addressed to Phillips Petroleum Co., Idaho Falls.

MONTANA

TO ADD AT CUT BANK—Union Oil Co. of Calif. plans $100,000 Unifining unit at its Cut Bank refinery, to use excess hydrogen gas produced by catalytic reformer now under construction by Ralph M. Parsons Co. Unifiner's capacity will be 450 bbl. per stream day.

NEVADA

TUNGSTEN MILL FOR AUSTIN—Uranium Mines of America, Inc., will set up complete tungsten milling plant for treatment of ore from its Linka mine east of Austin. Mill will be moved to site near mine as soon as grading of site and pouring of foundations is completed. Capacity is rated at about 200 tons daily.

TITANIUM STOCKPILE—U. S. General Services Administration, with approval of Office of Defense Mobilization, enters into agreement with Titanium Metals Corp. of America, Henderson, to buy maximum of 600,000 lb. of titanium by June 30 at market price. Under a second agreement, GSA will buy from DuPont of Wilmington, Del., a maximum of 1,250,000 lb. Government plans to resell metals to industry. Titanium Metals Corp. also has an earlier contract with GSA, covering production of 18,000 tons of titanium sponge over a five-year period.

NEW SULPHUR PLANT—Continental Sulphur and Phosphate Co. of Dallas, Tex., will build $200,000 plant at site not yet determined in Humboldt County, Nev. Construction contract has been awarded American Sulphur and Refining Co. of Los Angeles, with plant scheduled for operation by November. Plant will produce about 75 tons daily of refined powdered sulphur, employing about 10 persons.

TUNGSTEN MILL OPENS—Tungsten mill producing concentrates for sale to federal government begins operations at Idaho-Maryland Mine in Nevada County.

NEW MEXICO

AEC-ANACONDA CONTRACT—Anaconda Copper Mining Co. signs contract with Atomic Energy Commission to build additional facilities at company's uranium ore processing plant at Bluewater, near Grants. First plant, opened in autumn 1953, uses carbonate leaching process to treat limestone gangue ores. Plant expansion will add acid leaching circuit for treatment of sandstone gangue ores, scheduled to be completed in about 18 months, and also increase capacity of carbonate leaching process.

OREGON

ATOMIC POWER STUDY—Atomic Energy Commission enters into agreement with five Pacific Northwest utility companies under which companies will conduct one-year engineering study on design, construction, and operation of a nuclear power reactor. Costs of study will be borne by companies, which are Montana Power Co., Butte; Washington Water Power Co., Spokane; Pacific Power and Light Co., Portland; Portland General Electric Co., Portland; and Mountain States Power Co., Albany, Ore. This is thir-

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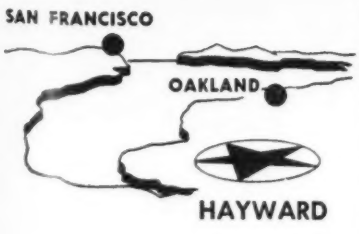

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teenth project of its kind under AEC's industrial participation program, but first undertaken by utilities in Pacific Northwest.

POWER MERGER APPROVED—Federal Power Commission approves merger of Mountain States Power Co., Albany, Ore., and Pacific Power and Light Co., Portland. State power commissions of Oregon, Washington, Idaho, and Wyoming, as well as stockholders of both companies, have previously given approval. Merger will be effected by exchange of stocks.

PLANNING FOR NATURAL GAS—Portland Gas & Coke Co., Portland, hires Stone & Webster Corp. to assist with plans for converting distribution system and customers' appliances from manufactured to natural gas, anticipating import of natural gas to Northwest. Conversion program is expected to cost over $20,000,000 during first few years of natural gas operation. Stone & Webster and its subsidiary, Conversion & Surveys, Inc., are already at work on study.

MILL AND PLANER—Mt. Baldy Lumber Co. is building new Swedish gang sawmill and planer at a site halfway between Drain and Yoncalla. Mill, to be in operation by July, will have a capacity of 60,000 ft. per 8-hr. shift.

PLAN CHIP BOARD PLANT—Chip Board Products, Inc., is incorporated by six Grants Pass businessmen, with capital of $150,000, for manufacture of panels from wood waste. Machinery will be imported from Germany in about six months, and company will build plant to be ready by that time.

ACTION ON WASTE DISPOSAL—Oregon State Sanitary Authority directs abatement proceedings to begin by January 1, 1955, against 15 concerns discharging waste into Columbia slough, unless they comply with sanitary laws by that time. Further, if any firm cannot show satisfactory progress in reducing pollution by the time of Authority's next meeting sometime in July, abatement proceedings will begin immediately. Eight of the offending companies are meat processing plants, five are hog feeding farms, and two are rendering plants.

UTAH

EXPAND URANIUM PLANT—Atomic Energy Commission awards contract to Galigher Co., Salt Lake City, for design of additional ore-processing facilities at Monticello uranium plant, owned by federal government and operated by Galigher since 1948. Upon completion of engineering design, including plans, specifications, and cost estimates, AEC will advertise for construction bids. Facilities will consist of expanded crushing equipment, acid leaching process, and newly developed methods of uranium precipitation, enabling Monticello plant to treat stockpiles of refractory uranium ores which cannot be processed by existing methods.

AND VITRO EXPANDS—Vitro Uranium Co. plans $200,000 expansion in 1954 and $300,000 in 1955 for its Salt Lake City uranium mill. Project, still on planning boards, will include additions in roasting, ore handling, and leaching departments. Capacity will reportedly increase by 50% upon completion of two-year program.

RECOMMENDATION—Price and Tooele are proposed to Atomic Energy Commission as possible sites for an atomic reactor by Senator Wallace F. Bennett (R.-Utah).

WASHINGTON

POTATOES AND BEANS—Routh Produce Co., of Twin Falls, Idaho, opens a potato processing warehouse and bean processing plant in Ephrata. Buildings used by former Ephrata air base are being leased from city for warehouse and plant. Operations are managed by L. W. Verne Routh and Cliff E. Thompson.

CHIPPER FOR RAYONIER—Pulpwood chipper made and shipped by D. J. Murray Manufacturing Co., Wausau, Wis., is installed in new wood department of Rayonier, Inc., Port Angeles. Chipper is designed to handle 150 cords of pulpwood per hour, cutting up whole logs as large as 36 in. in diameter and 20 ft. in length—from log to chips in about 10 seconds. Machine will be used largely on converting western hemlock to pulp for sale to rayon manufacturing concerns.

FPC HEARING—Staff of Federal Power Commission recommends that Commission reject applications now before it for supplying natural gas to Pacific Northwest, on grounds that neither Pacific Northwest Pipeline Corp. nor Westcoast Transmission Co., Inc., has shown it has adequate supplies of gas to draw upon or adequate financial resources for constructing transmission facilities. Full commission will meet in June to hear arguments, and final decision is expected around August 1.

WYOMING

COAL CARBONIZATION—Local businessmen and technicians consider commercial feasibility of establishing coal carbonization plant in Rock Springs, proposed by Franklyn P. Wood Associates, Washington, D. C. Plant would use coal mined in Sweetwater county for production of industrial chemicals and smokeless coke.

URANIUM MILL POSSIBLE—Atomic Energy Commission may set up uranium ore procurement office and processing mill in Wyoming, if quality of ore developed in the state is adequate. Site for proposed depot and mill will depend upon location of best uranium deposits.

DOUBLE FEATURE—Robert H. Braun Co., Los Angeles, opens two new branches, one at San Diego, Calif. (above), and other at Phoenix, Ariz. Both plants have show rooms, complete maintenance and repair shops, and parts departments for sales and service of Clark and Ross materials handling equipment. Branches also carry specialized equipment for industry, representing Robco, Inc.

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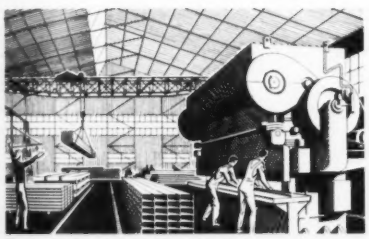

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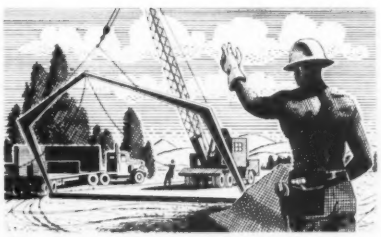

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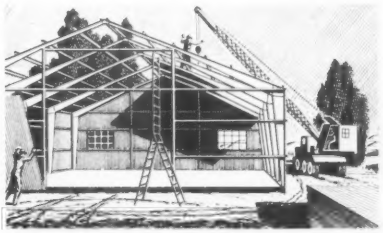

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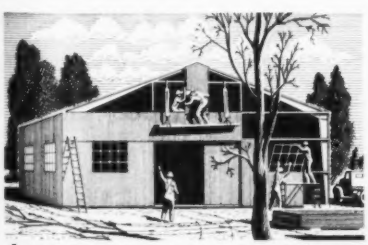

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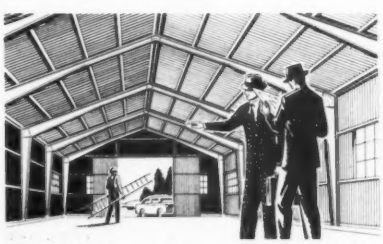

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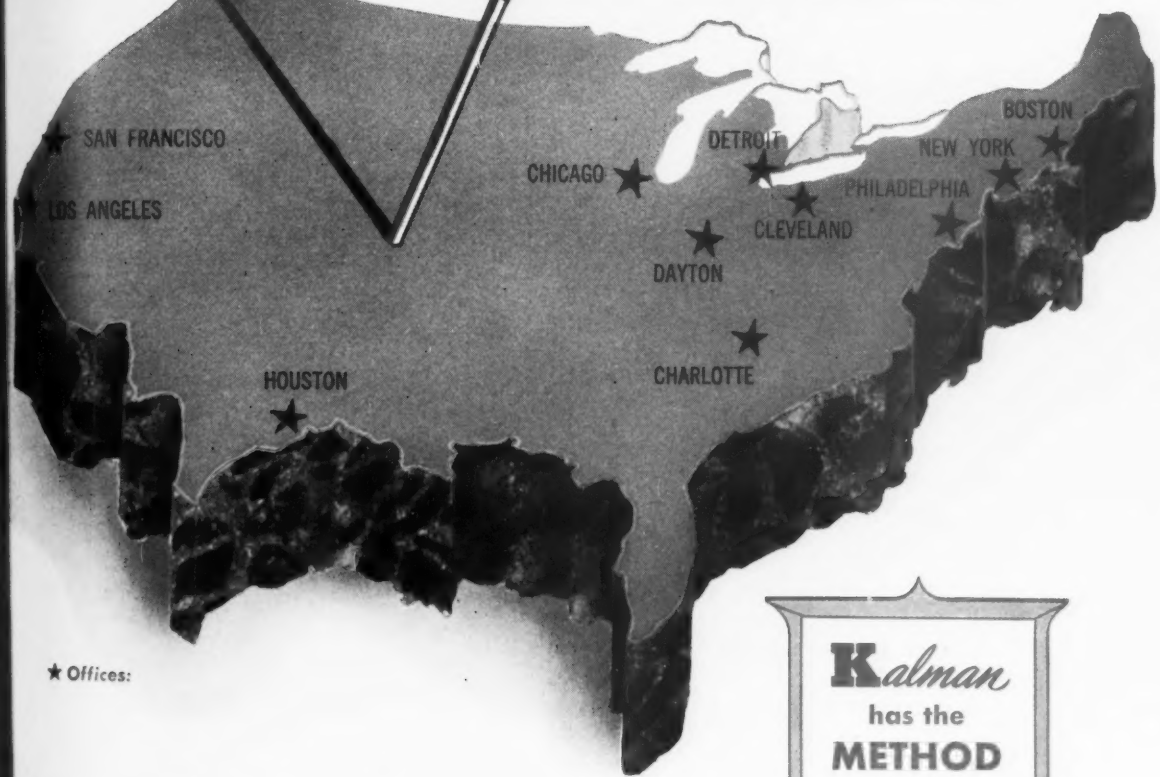

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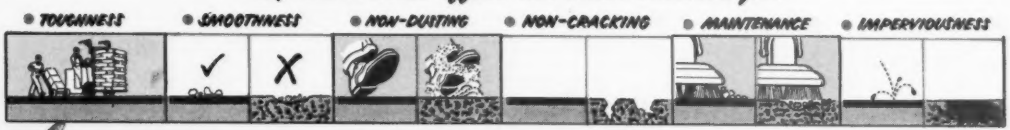

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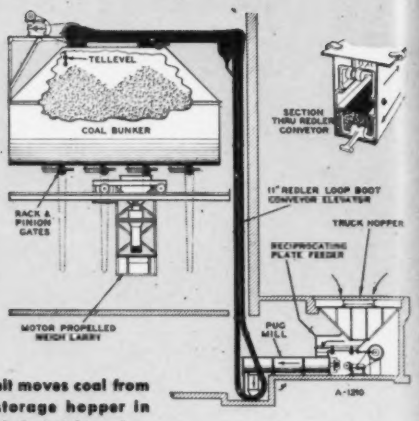

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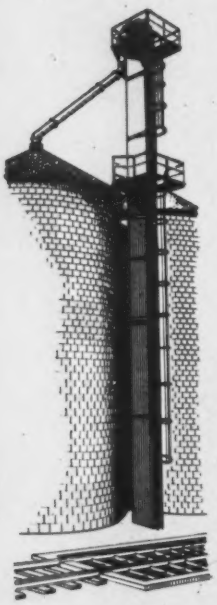

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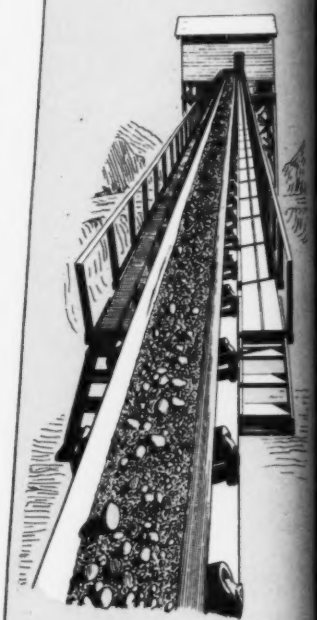

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